THE AMERICAN YEAR BOOK

RECORD OF THE YEAR

1929

UNIVERSITY OF ILLINOIS
UNDERGRADUATE DIVISION
CHICAGO
LIBRARY

1867

THE AMERICAN
YEAR BOOK

THE AMERICAN YEAR BOOK

A Record of Events and Progress

YEAR 1929

EDITOR

ALBERT BUSHNELL HART, LL.D.

ASSOCIATE EDITOR

WILLIAM M. SCHUYLER

EDITED WITH THE COOPERATION OF
A SUPERVISORY BOARD REPRESENT-
ING NATIONAL LEARNED SOCIETIES

NEW YORK
THE AMERICAN YEAR BOOK CORPORATION
229 WEST 43RD STREET
1930

U OF I
LIBRARY

ACKNOWLEDGMENT

THE PUBLICATION OF THE AMERICAN YEAR BOOK FOR THE YEAR 1929 HAS BEEN MADE POSSIBLE BY THE PUBLIC SPIRITED GENEROSITY OF THE NEW YORK TIMES COMPANY AND ITS PRESIDENT, MR. ADOLPH S. OCHS.

COPYRIGHT, 1930,
BY THE AMERICAN YEAR BOOK CORPORATION
All rights reserved

Printed in the United States of America by
J. J. LITTLE AND IVES COMPANY, NEW YORK

E
171
A585
1929
N/C

PREFACE

In these days when advance in science, engineering, economics, matters of government and international relations, is so rapid and affects so deeply the intimate life of every man, woman and child, it is particularly important to keep abreast of the major developments in the life of the world and of the nation in particular, and the purpose of THE AMERICAN YEAR BOOK is to provide from year to year a record of achievements in the life of the nation in the broadest meaning of these terms.

Since 1925 The American Year Book has had the advantage of the interest and support of *The New York Times* and its publisher, Mr. Adolph S. Ochs, whose support in a kindred enterprise—the monumental *Dictionary of American Biography*—is well known. At the other pole of the enterprise are the representatives of forty-five of the leading learned societies of the Nation, whose representatives have shared in the inception and progress of this manual. Through those societies and by direct request, about two hundred specialist writers have contributed to the surveys of the various fields of learning and of intellectual activity.

For every article, either through the organization represented or through selection by the editors, writers of acknowledged authority have epitomized the harvest of the year in their respective fields. It is the hope and expectation of all concerned in the preparation of the volume—publishers, members of the supervisory Board, specialists and authors, and the editors—that The American Year Book shall be not only a record of the significant developments in the United States during each calendar year, but a source of information and coördination for readers and for future writers. It is aimed to make the annual volume a concise, coördinated and authoritative record of current American achievements.

The American Year Book is a series of reviews of outstanding things in the fields of its two hundred and thirty articles. To each of the twenty-seven divisions is added a brief list of cognate societies with carefully verified addresses. These lists will aid the searcher to establish relations with any one of several hundred organizations which are glad to promote the quest for information. This may be an aid, not only to specialists, but to researchers and to students in schools, colleges and professional schools, who want to know where to look for the latest progress made in the subject of their major interest.

The list of Constituent Societies, following the Table of Contents, presents the persons and organizations directly responsible for the work of this volume. There follows the list of contributing authors, which is comprised of a large body of men active as administrators, researchers, teachers and technical experts.

TABLE OF CONTENTS

PAGE

Preface v

Constituent Societies and Supervisory Board xi

Contributors xiii

PART ONE: HISTORICAL

DIVISION

I. American Political History 1

Congress and Its Functions.—Significant Federal Legislation.—Presidential Policies.—National Statesmen.—The Prohibition Controversy.—State and Local Elections.

II. International Situations Affecting the United States . 24

The United States Foreign Service.—Treaties Completed and Ratified.—American Influence in World Affairs.—Latin-American Relations.—American Relations in the Orient and Near East.—The Italy-Vatican Accord.—International Conferences.—America's Relations to the League of Nations and World Court.—The Institute of Politics.—The Institute of Pacific Relations.

PART TWO: AMERICAN GOVERNMENT

III. The National Government 59

Personnel of the Seventy-first Congress.—Members of the Senate and the House of Representatives.—Personnel of the Administration.—Federal Administrative Organization.—Federal Civil Service.—Personnel of the Judiciary.—Federal Judicial Prosecutions.

IV. State Government 90

National and Interstate Relations of States.—State Constitutions, Referenda and Initiatives.—Changes in Electoral Laws.—State Legislatures and Legislation.—State Executives and Departments.—State Administration and Judiciary.—County and Rural Government.

V. Municipal Government 103

City Politics.—Types of Municipal Government.—Administration and Research.—Municipal Functions.—Metropolitan and Regional Planning.—Zoning.—City Planning.

DIVISION PAGE

VI. TERRITORIES AND SPHERES OF INFLUENCE 127

Alaska and Hawaii.—Porto Rico.—The District of Columbia.—Philippine Islands.—Virgin Islands, Guam and American Samoa.—Maritime Jurisdiction.—Spheres of American Influence.

PART THREE: GOVERNMENTAL FUNCTIONS

VII. PUBLIC FINANCE AND TAXATION 151

National Revenues and Expenditures.—The National Budget.—The National Debt and the Allied Debts to the United States.—State Finance.—City Finance.—Tax Legislation.—Land and Property Taxes.—Income Taxes.—Corporation and Bank Taxes.—Inheritance Taxes.—Automobile and License Taxes.

VIII. PUBLIC RESOURCES AND UTILITIES 196

Federal Surveys and Maps.—State Geological Surveys.—Reclamation and Irrigation.—Public Lands.—Land Titles and Restrictions.—Public Service Commissions.—Public Utility Mergers.—Municipal Ownership and Operation.—Street Traffic and Regulation.—Waterways and Harbors (See also Division IX).—Water Supply.—Electric Lighting and Power.

IX. DEFENSE AND ARMAMENTS 238

Military Problems of the United States.—Organization of the Army.—Accomplishments of Army Personnel.—Military Aeronautics.—Military Education.—Military and Naval Pensions.—United States Veterans Bureau.—Waterways and Harbors (See also Division VIII).—The Ohio River Development.—Organization of the Navy.—Functions of the Navy.—Naval Construction and Equipment.—Naval Aeronautics.—Naval Education.

PART FOUR: ECONOMICS AND BUSINESS

X. BUSINESS AND FINANCE 294

General Business Conditions.—The Security and Money Markets.—Banking Transactions.—Foreign Trade.—Railroad Traffic and Earnings.—Control of Production.—International Trade Control.—Public Regulation of Futures Trading.—Public Protection of Securities.—Investment Trusts.—National and State Banks.—The Federal Reserve System.—Other Banks.—Trust Companies.—Foreign Exchange.—Life Insurance.—Fire Insurance.—Marine Insurance.—Casualty and Miscellaneous Insurance.—Financial Chronology.

XI. AGRICULTURE AND ALLIED INDUSTRIES 369

Conditions of Agriculture.—Agricultural Legislation.—Grains and Cotton.—Live Stock and Meats.—Dairying.—Diseases and Pests of Animals.—Insect Pests.—Marketing.—Horticulture.—Forestry.—Fisheries.

DIVISION PAGE

XII. MINERAL INDUSTRIES 401

Mining and Ore Dressing.—Coal and Coke.—Petroleum.—Copper.—Gold and Silver.—Iron and Steel.—Zinc.—Lead.

XIII. MANUFACTURES AND TRANSPORTATION 420

General Conditions in Manufacturing.—Administration of the Tariff.—United States Tariff Commission.—Exports and Imports.—Conditions of Internal Commerce.—Railroads.—Highways and Motor Roads.—Motor Bus Service.—Urban and Inter-Urban Railways.—The Merchant Marine.—The Airship and Airplane Technique.—The Radio.—Manufacturing Statistics.

PART FIVE: SOCIAL CONDITIONS AND AIMS

XIV. IMMIGRATION, RACES AND POPULATION 469

Race Conditions in the United States.—Immigration Problems.—The Quota System.—Citizenship and Naturalization.—Population Statistics.

XV. SOCIAL PROBLEMS AND CONDITIONS 488

Crime Conditions in the United States.—Prisons and Penal Conditions.—Preventive Work in Delinquency.—Socialism.—Organized Social Work.—Housing Problems.—Social Hygiene.—Mental Hygiene.—Child Welfare.

XVI. LABOR AND LABOR LEGISLATION 519

Conditions of Labor.—Labor Organizations.—Child Labor.-Labor in Politics.—Labor Legislation.—Employment and Unemployment.—Labor Mediation.—Strikes and Lockouts.—Workmen's Compensation and Insurance.

XVII. RELIGION AND RELIGIOUS ORGANIZATIONS 542

Interdenominational Conferences and Activities.—Church and Government Relations.—Protestant Denominational Activities.—The Roman Catholic Church.—Affairs of the Orthodox Oriental Church.—Judaism and Jewish Communal Affairs.

PART SIX: SCIENCE—PRINCIPLES AND APPLICATION

XVIII. MATHEMATICS AND ASTRONOMY 569

Mathematical Research.—The Josiah Willard Gibbs Lecture.—Application of Mathematics to Social Agencies.—Differential Equations in Engineering.—History of Mathematics.—Mathematics in Secondary Schools.—Astronomy.—Planetaria.—American Astronomical Society.—Sun and Solar Eclipses.—Comets.—Jupiter.—Stellar Parallaxes.—Stellar Spectrosity.—Universes.

XIX. ENGINEERING AND CONSTRUCTION 583

Structural Engineering.—Mechanical Engineering.—Electrical Engineering.—Automotive Engineering.—Naval Architecture and Marine Engineering.—Commercial Marine Engineering.—Materials of Engineering and Construction.—Industrial Standardization.—Commercial Aviation.—Mississippi Flood Control.—American Machinery.

DIVISION PAGE

XX. GEOPHYSICAL SCIENCES 646

Dynamic and Structural Geology.—Earthquakes and Volcanoes.—Economic Geology.—Mineralogy and Petrography.—Meteorology and Climatology.—Terrestrial Magnetism.—Economic Geography.—Cartography.—American Exploration.

XXI. CHEMISTRY AND PHYSICS 670

Inorganic and Physical Energy.—Organic Chemistry.—Agricultural Chemistry.—Electrochemistry.—Industrial Chemistry and Chemical Engineering.—Physics.

XXII. BIOLOGICAL SCIENCES 692

Organic Evolution. — Vertebrate Zoology. — Invertebrate Zoology. — Vertebrate Paleontology. — Botany. — Economic Botany.—Entomology.

XXIII. MEDICAL SCIENCES 717

Physiology.—Pathology.— Medicine.— Pharmacology.—Surgery.—Dentistry.—Public Health and Hygiene.—Vital Statistics.

XXIV. PHILOSOPHICAL AND SOCIAL SCIENCES 740

Philosophy. — Psychology. — Sociology. — Anthropology. — Ethnology.—Mental Tests and Measurements.

PART SEVEN: THE HUMANITIES

XXV. LITERATURE AND LANGUAGE 764

History, Biography and Travel.—American Fiction.—Criticism and Belles Lettres.—English Language and Literature.—Germanic Languages and Literature.—Romance Languages and Literature.—Latin Literature.—Greek Literature.—Semitic Languages and Literature.—Indo-European Linguistics.—Libraries.

XXVI. THE ARTS 799

Archaeological Discovery.— Painting.— Sculpture.— Architecture.—Music and the Opera.—The Theater.—Motion Pictures.

XXVII. EDUCATION 827

Elementary Education.—Secondary Education.—Collegiate Education.—Education for the Professions.—Vocational Education.—Adult Education.—Pure Research in Educational Institutions.—Educational Miscellanies.

INDEX 863

CONSTITUENT SOCIETIES AND SUPERVISORY BOARD

SOCIETIES AND REPRESENTATIVES

1. **ACADEMY OF POLITICAL SCIENCE IN THE CITY OF NEW YORK.**
   George W. Ochs Oakes, *The New York Times.*
2. **ACTUARIAL SOCIETY OF AMERICA.**
   Wendell M. Strong, 32 Nassau Street, New York.
3. **AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE.**
   Dr. Ernest M. Patterson, University of Pennsylvania, Philadelphia.
4. **AMERICAN ANTHROPOLOGICAL ASSOCIATION.**
   Prof. George Grant MacCurdy, Yale University, New Haven.
5. **AMERICAN ANTIQUARIAN SOCIETY.**
   Waldo Lincoln, Worcester, Massachusetts.
6. **AMERICAN ASSOCIATION OF ECONOMIC ENTOMOLOGISTS.**
   E. Porter Felt, Bartlett Tree Research Laboratories, Stamford.
7. **AMERICAN ASSOCIATION OF MUSEUMS.**
   Charles R. Richards, General Education Board, New York.
8. **AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.**
   Prof. Edward G. Conklin, Princeton University, Princeton.
9. **AMERICAN ASSOCIATION FOR LABOR LEGISLATION.**
   Prof. Henry W. Farnum, Yale University, New Haven.
10. **AMERICAN ASTRONOMICAL ASSOCIATION.**
    Prof. Henry N. Russell, Princeton University, Princeton.
11. **AMERICAN BAR ASSOCIATION.**
    Associate Justice Harlan F. Stone, Washington.
12. **AMERICAN CHEMICAL SOCIETY.**
    Col. Marston T. Bogert, 1158 Fifth Avenue, New York.
13. **AMERICAN COUNCIL OF LEARNED SOCIETIES.**
    Waldo G. Leland, 907 Fifteenth Street, Washington.
14. **AMERICAN ECONOMIC ASSOCIATION.**
    Prof. Edwin R. A. Seligman, Columbia University, New York.
15. **AMERICAN FEDERATION OF ARTS.**
    Herbert Adams, 131 West 11th Street, New York.
16. **AMERICAN HISTORICAL ASSOCIATION.**
    Prof. Albert Bushnell Hart, Harvard University, Cambridge.
17. **AMERICAN INSTITUTE OF ARCHITECTS.**
    Frank C. Baldwin, 1741 New York Avenue, Washington.
18. **AMERICAN INSTITUTE OF CRIMINAL LAW.**
    Dr. George W. Kirchwey, 105 East 22nd Street, New York.
19. **AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.**
    Henry H. Henline, 33 West 39th Street, New York.
20. **AMERICAN INSTITUTE OF MINING ENGINEERS.**
    Prof. Bradley Stoughton, Lehigh University, Bethlehem.

21. AMERICAN INSTITUTE OF RADIO ENGINEERS.
    DR. A. M. GOLDSMITH, Radio Corporation of America, New York.
22. AMERICAN LIBRARY ASSOCIATION.
    JAMES I. WYER, State Librarian, Albany.
23. AMERICAN MATHEMATICAL SOCIETY.
    PROF. TOMLINSON FORT, Lehigh University, Bethlehem.
24. AMERICAN MEDICAL ASSOCIATION.
    DR. ALEXANDER LAMBERT, 43 East 72nd Street, New York.
25. AMERICAN ORIENTAL SOCIETY.
    PROF. A. V. WILLIAMS JACKSON, Columbia University, New York.
26. AMERICAN PALEONTOLOGICAL SOCIETY.
    DR. WILLIAM D. MATTHEW, American Museum of Natural History.
27. AMERICAN PHILOLOGICAL ASSOCIATION.
    DR. JOHN C. ROLFE, University of Pennsylvania, Philadelphia.
28. AMERICAN PHYSICAL SOCIETY.
    PROF. EDWARD L. NICHOLS, Cornell University, Ithaca.
29. AMERICAN POLITICAL SCIENCE ASSOCIATION.
    PROF. W. W. WILLOUGHBY, Johns Hopkins University, Baltimore.
30. AMERICAN PUBLIC HEALTH ASSOCIATION.
    DR. MILTON J. ROSENAU, 65 Naples Road, Brookline, Massachusetts.
31. AMERICAN SOCIETY OF INTERNATIONAL LAW.
    PROF. GEORGE G. WILSON, Harvard University, Cambridge.
32. AMERICAN SOCIETY OF MECHANICAL ENGINEERS.
    CALVIN W. RICE, 29 West 39th Street, New York.
33. AMERICAN SOCIETY FOR TESTING MATERIALS.
    F. M. FARMER, East End Avenue and 80th Street, New York.
34. AMERICAN SOCIOLOGICAL SOCIETY.
    PROF. FRANK H. HANKINS, Smith College, Northampton.
35. AMERICAN STATISTICAL ASSOCIATION.
    EDWIN I. KOPF, Metropolitan Life Insurance Co., New York.
36. ARCHÆOLOGICAL INSTITUTE OF AMERICA.
    PROF. RALPH VANDEMAN MAGOFFIN, New York University, New York.
37. BOTANICAL SOCIETY OF AMERICA.
    DR. GEORGE T. MOORE, Missouri Botanical Garden, St. Louis.
38. GENERAL FEDERATION OF WOMEN'S CLUBS.
    MRS. CLARENCE FRAIM, 2401 Baynard Boulevard, Wilmington, Del.
39. GEOLOGICAL SOCIETY OF AMERICA.
    PROF. WILLIAM M. DAVIS, Harvard University, Cambridge.
40. NATIONAL ÆRONAUTIC ASSOCIATION.
    GODFREY L. CABOT, 16 Highland Street, Cambridge, Massachusetts.
41. NATIONAL CONFERENCE OF SOCIAL WORK.
    DR. HASTINGS H. HART, Russell Sage Foundation, New York.
42. NATIONAL EDUCATION ASSOCIATION.
    CHANCELLOR ELMER E. BROWN, New York University, New York.
43. NATIONAL GEOGRAPHIC SOCIETY.
    DR. GILBERT GROSVENOR, National Geographic Society, Washington.
44. NATIONAL MUNICIPAL LEAGUE.
    CLINTON ROGERS WOODRUFF, North American Building, Philadelphia.
45. NATIONAL SOCIETY OF VOCATIONAL EDUCATION.
    L. H. DENNIS, State Director of Vocational Education, Harrisburg, Pa.
46. THE SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS.
    CAPT. W. M. MCFARLAND, 85 Liberty Street, New York.

CONTRIBUTORS

P. G. Agnew, B.L., A.M., Ph.D.: INDUSTRIAL STANDARDIZATION.
Secretary, American Engineering Standards Committee.

R. H. Aishton: RAILROADS.
President, American Railway Association.

Carroll S. Alden, B.A., Ph.D.: NAVAL EDUCATION.
Head of the Department of English, United States Naval Academy.

B. R. Alexander: NAVAL ARCHITECTURE AND ENGINEERING.
Lieutenant Commander, U. S. N.; Bureau of Engineering, Navy Department.

Charles R. Allen: VOCATIONAL EDUCATION.
Editor and Educational Consultant, Federal Board of Vocational Education.

Irene Osgood Andrews, A.B.: LABOR LEGISLATION.
Associate Secretary, American Association for Labor Legislation.

John B. Andrews, A.B., A.M., Ph.D.: WORKMEN'S COMPENSATION AND INSURANCE.
Secretary, American Association for Labor Legislation.

J. Brooks Atkinson: THE THEATER.
Dramatic Critic, *The New York Times.*

Beulah Bailey: TAX LEGISLATION.
Librarian, New York State Department of Taxation and Finance.

Catherine Smith Bailey, B.A., M.A.: MUSIC AND OPERA.
President, Radcliffe Musical Association; Reviewer, *Christian Science Monitor.*

Peter Bain: MERCHANT MARINE; NAVAL CONSTRUCTION.
Editor, *Shipping Illustrated, Bain's Marine Annual.*

Harland Bartholomew: CITY PLANNING.
Harland Bartholomew and Associates, St. Louis, Mo.

George A. Barton, A.B., A.M., Ph.D., LL.D.: SEMITIC LANGUAGES AND LITERATURE.
Professor of Semitic Languages, University of Pennsylvania.

Jacques Martin Barzun, A.M.: FEDERAL JUDICIAL PROSECUTIONS.
Department of History, Columbia University.

John Bauer, Ph.D.: PUBLIC SERVICE COMMISSIONS.
American Public Utilities Bureau, New York.

Albert Croll Baugh, Ph.D.: ENGLISH LANGUAGE AND LITERATURE.
Professor of English, University of Pennsylvania.

LaVerne Beales: MANUFACTURING STATISTICS.
Chief Statistician for Manufactures, Bureau of the Census, Department of Commerce.

J. Grist Brainerd: ELECTRICAL ENGINEERING.
Moore School of Electrical Engineering, University of Pennsylvania.

Hugh A. Brown, Ph.D.: RECLAMATION AND IRRIGATION.
Director of Reclamation, Department of the Interior.

Robert M. Brown, Ph.D.: AMERICAN EXPLORATION.
Professor, Department of Geology and Geography, Rhode Island College of Education.

Lytle Brown: WATERWAYS AND HARBORS.
Major General, U.S.A.; Chief of Engineers, War Department.

Friedrich Bruns, Ph.D.: GERMANIC LANGUAGES AND LITERATURE.
Assistant Professor of German, University of Wisconsin.

Arthur E. Buck: NATIONAL BUDGET.
Bureau of Municipal Research, New York.

Raymond Leslie Buell: INTERNATIONAL CONFERENCES.
Research Director, Foreign Policy Association.

Ada L. Bush: CONDITIONS OF INTERNAL COMMERCE.
Director, Special Inquiry Service for Domestic Trading, Bureau of Foreign and Domestic Commerce, Department of Commerce.

Allison Butts, A.B., B.S.: LEAD.
Assistant Professor of Metallurgy, Lehigh University; Associate Editor, *The Mineral Industry.*

W. F. Callander, Ph.D.: GRAIN AND COTTON CROPS.
Chairman, Crop Reporting Board, Bureau of Agricultural Economics, Department of Agriculture.

Leon Cammen, M.A.: MECHANICAL ENGINEERING.
Associate Editor, *Mechanical Engineering.*

H. K. Carroll, LL.D.: RELIGION AND RELIGIOUS ORGANIZATIONS.
Secretary, Ecumenical Methodist Conference; Corresponding Secretary, Francis Asbury Memorial Association.

C. C. Carstens: CHILD WELFARE.
Executive Director, Child Welfare League of America.

Russell L. Cecil, M.D.: MEDICINE.
Assistant Professor of Clinical Medicine, Cornell University; Assistant Visiting Physician, Bellevue Hospital.

Henry Chalmers, A.B., A.M.: INTERNATIONAL TRADE CONTROL.
Chief, Division Foreign Tariffs, Department of Commerce; Member, American Economic Association American Academy of Political and Social Science.

Earl D. Church: MILITARY AND NAVAL PENSIONS.
Commissioner of Pensions, Department of the Interior.

Lindley D. Clark, A.B., A.M., LL.B., LL.M.: LABOR IN POLITICS.
Deputy Commissioner, U. S. Employees Compensation Commission; Member, American Association for Labor Legislation.

H. Burdett Cleveland: WATER SUPPLY.
Consulting Sanitary Engineer, New York.

Alzada Comstock, Ph.D.: TAXATION.
Associate Professor of Economics, Mount Holyoke College.

Edwin F. Cone: IRON AND STEEL.
Associate Editor: *The Iron Age.*

Milton Conover, Ph.D.: PERSONNEL OF THE SEVENTY-FIRST CONGRESS.
Professor of Economics, Yale University.

Douglas F. Cox: MARINE INSURANCE.
President, United States Merchants' and Shippers' Insurance Company, New York.

Philip W. L. Cox, A.B., A.M., Ph.D.: SECONDARY EDUCATION.
Professor, School of Education, New York University.

Raymond F. Crist, LL.B.: CITIZENSHIP AND NATURALIZATION.
Commissioner of Naturalization, Department of Labor.

Harry Francis Cunningham: ARCHITECTURE.
Architect, New York; Member, American Institute of Architects.

Herbert H. Davis, M.D.: SURGERY.
Director of Laboratory of Experimental Surgery, University of Nebraska College of Medicine.

J. A. Dawson: INVERTEBRATE ZOOLOGY.
Department of Zoology, College of the City of New York.

Ned H. Dearborn: EDUCATIONAL MISCELLANIES.
Professor of Education, New York University.

J. H. Dellinger, A.B., Ph.D.: RADIO.
Chief of Radio Laboratory, U. S. Bureau of Standards; Past President, The Institute of Radio Engineers.

Gurden Edwards: BANKS AND BANKING.
Director, Public Relations Commission, American Bankers Association.

Milton S. Eisenhower: AGRICULTURAL LEGISLATION.
Director of Information, Department of Agriculture.

W. Elmer Ekblaw, B.Sc.: ECONOMIC GEOLOGY AND GEOGRAPHY.
Assistant Editor, *Economic Geography,* Clark University.

Charles W. Eliot, 2nd: REGIONAL PLANNING.
City Planner, National Capital Park and Planning Commission.

Albert R. Elsasser, A.M., Ph.D.: CRITICISM AND BELLES LETTRES.
Assistant Professor of English, Princeton University.

Mary L. Ely: ADULT EDUCATION.
Publications Editor, American Association for Adult Education.

Ray H. Everett, A.B., LL.B.: SOCIAL HYGIENE.
Director, Department of Public Information, American Social Hygiene Association; Managing Editor, *Journal of Social Hygiene.*

Douglas P. Falconer: PREVENTIVE WORK IN DELINQUENCY.
Executive Secretary, Children's Aid Society, Buffalo.

E. Porter Felt, D.Sc.: ENTOMOLOGY.
Chief Entomologist, Bartlett Tree Research Laboratories, Stamford, Conn.; Member, American Association of Economic Entomologists.

Colin G. Fink, B.A., M.A., Ph.D.: ELECTROCHEMISTRY.
Professor, Department of Chemical Engineering, Columbia University; Secretary, American Electrochemical Society; Member, National Research Council, American Institute of Mining and Metallurgical Engineers.

Irving Fisher, A.B., Ph.D.: PROHIBITION.
Professor of Political Economy, Yale University.

Ralph Flint: SCULPTURE.
Critic, Author, Artist, New York.

Tomlinson Fort, A.B., A.M., Ph.D.: MATHEMATICS.
Professor of Mathematics, Lehigh University.

Frank N. Freeman: MENTAL TESTS AND MEASUREMENTS.
Professor of Education, University of Chicago.

W. R. Furlong: VIRGIN ISLANDS, GUAM AND AMERICAN SAMOA.
Captain U.S.N.; Office of Naval Intelligence, Navy Department.

William Addleman Ganoe, A.B., A.M.: MILITARY AFFAIRS.
Major, U.S.A.; Historical Section, Army War College.

Harry Gold, M.D.: PHARMACOLOGY.
Department of Pharmacology, Cornell University Medical School.

E. A. Goldenweiser: FEDERAL RESERVE SYSTEM.
Director of Research and Statistics, Federal Reserve Board.

Ernest P. Goodrich, B.Pd., B.Sc.: STREET TRAFFIC AND REGULATION.
Consulting Engineer, Russell Sage Foundation.

George Gove: HOUSING PROBLEMS.
Secretary, State Housing Board, New York.

Frederic H. Guild: STATE CONSTITUTIONS.
Professor of Political Science, University of Kansas.

Andrew F. Haiduck: COMMERCIAL AVIATION.
Aeronautical Engineer, Bellanca Aircraft Corporation.

Mordaunt Hall: MOVING PICTURES.
Moving Picture Critic, *The New York Times.*

R. Dawson Hall: COAL AND COKE.
Engineering Editor: *The Coal Age.*

Ray Ovid Hall: IMPORTS AND EXPORTS.
Assistant Chief, Bureau of Foreign and Domestic Commerce, Department of Commerce.

Frank H. Hankins, A.B., Ph.D.: SOCIOLOGY AND SOCIAL SCIENCES.
Professor of Sociology at Smith College; Member, Sociological Society, Academy of Political Science, Sociological Society of London.

Edward R. Hardy: FIRE INSURANCE.
Secretary-Treasurer, Insurance Institute of America.

James Hart, Ph.D.: THE PRESIDENT AND NATIONAL STATESMEN.
Associate in Political Science, Johns Hopkins University.

H. K. Hayes, D.Sc.: ECONOMIC BOTANY.
Chief, Division of Agronomy and Plant Genetics, University of Minnesota.

Daniel L. Hazard, A.B.: TERRESTRIAL MAGNETISM.
Assistant Chief, Division of Terrestrial Magnetism and Seismology, U. S. Coast and Geodetic Survey.

Charles W. Henderson: GOLD AND SILVER.
Engineer in Charge, Denver Section Mineral Statistics, U. S. Bureau of Mines.

Frances M. Henderson: PAINTING.
American Federation of Arts.

Charles E. Hill, A.B., A.M., Ph.D.: MARITIME JURISDICTION.
Professor of Political Science, George Washington University.

Frank T. Hines, LL.D.: VETERANS.
Brigadier General, O.R.C.; Director, U. S. Veterans Bureau.

Ira V. Hiscock, M.D.: PUBLIC HEALTH AND HYGIENE.
Associate Professor of Public Health, Yale School of Medicine.

Thomas N. Hoover: ELECTION STATISTICS.
Professor of History, Ohio University.

Orren C. Hormell: COUNTY AND RURAL GOVERNMENT.
De Alba Stamwood Alexander Professor of Government, Bowdoin College.

Robert Chisolm Horn, A.B., A.M., Ph.D., Litt.D.: GREEK LITERATURE.
Professor of Greek, Muhlenberg College; Lecturer in Greek, University of Pennsylvania; Member, American Philological Association.

James F. Hosic: ELEMENTARY EDUCATION.
Teachers College, Columbia University.

Solomon S. Huebner, B.S., M.S., Ph.D.: ECONOMIC AND BUSINESS CONDITIONS.
Professor of Insurance and Commerce, University of Pennsylvania; Associate Editor, *Annals of American Academy of Political and Social Science;* Member, American Institute of Banking.

Wilbur S. Hulin: PSYCHOLOGY.
Instructor, Department of Psychology, Princeton University.

Harry E. Hull: THE QUOTA SYSTEM.
Commissioner General of Immigration, Department of Labor.

Merlin H. Hunter, Ph.D.: NATIONAL FINANCE.
Associate Professor of Economics, University of Illinois.

Charles D. Hurd: ORGANIC CHEMISTRY.
Secretary, Department of Chemistry, Northwestern University.

Arthur M. Hyde: CONDITIONS OF AGRICULTURE.
United States Secretary of Agriculture.

J. A. Hyslop, B.S., M.S.: PLANT PESTS.
Entomologist in charge, Insect Pest Survey, Bureau of Entomology, Department of Agriculture.

Walter Renton Ingalls, S.B., E.D.: ZINC.
Consulting Engineer, New York; Member, American Institute of Mining and Metallurgical Engineers.

A. H. Jansson: COMMERCIAL MARINE ENGINEERING.
Editor, *Marine Review,* Cleveland.

Jens P. Jensen, Ph.D.: TAXATION.
Professor of Economics, University of Kansas.

W. L. G. Joerg: CARTOGRAPHY.
Editor, *Research Series,* American Geographical Society; Member, Division of Geology and Geography, National Research Council.

Ernest Jones, A.M.: THE AIRSHIP AND AIRPLANE TECHNIQUE.
Aeronautical Expert, New York.

John B. Kelly: THE ROMAN CATHOLIC CHURCH.
Spiritual Director, Catholic Writers' Guild of America, Inc.

Fred. I. Kent: FOREIGN EXCHANGE.
Director, Bankers Trust Company, New York.

Milo S. Ketchum, C.E., Sc.D.: STRUCTURAL ENGINEERING.
Dean, College of Engineering, and Director, Engineering Experiment Station, University of Illinois.

Charles Kettleborough: ELECTORAL LAWS.
Director, Indiana Legislative Bureau.

James E. Kindred, Ph.D.: VERTEBRATE ZOOLOGY.
Associate Professor of Histology and Embryology, University of Virginia.

Sidney D. Kirkpatrick: INDUSTRIAL CHEMISTRY AND CHEMICAL ENGINEERING.
Editor, *Chemical and Metallurgical Engineering,* New York.

Arthur J. Klein: COLLEGIATE EDUCATION.
Chief, Division of Higher Education, Bureau of Education, Department of the Interior.

Howard R. Knight: ORGANIZED SOCIAL WORK.
General Secretary, National Conference of Social Work.

Roland L. Kramer, Ph.D.: FOREIGN TRADE.
Assistant Professor of Commerce and Transportation, University of Pennsylvania.

Harry H. Laughlin, B.S., M.S., Sc.D.: RACE CONDITIONS.
Assistant Director, Department of Genetics, Carnegie Institution of Washington.

Algernon Lee: SOCIALISM.
President, Rand School of Social Science, New York; Editor, *The New Leader.*

L. Don Leet, A.B.: EARTHQUAKES AND VOLCANOES.
Research Seismologist, Dominion Observatory, Ottawa.

M. M. Leighton: STATE GEOLOGICAL SURVEYS.
Chief, Illinois State Geological Survey; Secretary, Association of American State Geologists.

Harold J. Leonard, D.D.S., B.A.: DENTISTRY.
Professor of Dentistry, Columbia University.

Ernest R. Lilley, Sc.D.: PETROLEUM.
Associate Professor of Geology, New York University.

Charles E. Locke, S.B.: MINING AND ORE DRESSING.
Professor of Mining Engineering, Massachusetts Institute of Technology; Member, American Institute of Mining Engineers.

Frederick B. Loomis, B.A., Ph.D.: VERTEBRATE PALEONTOLOGY.
Professor of Geology, Amherst College.

Amy Loveman: AMERICAN FICTION.
Managing Editor, *The Saturday Review of Literature,* New York.

Albert H. Lybyer, A.B., A.M., Ph.D.: ORIENTAL AND NEAR EASTERN RELATIONS; ITALY VATICAN ACCORD.
Professor of History, University of Illinois.

Thomas H. MacDonald, B.C.D.: HIGHWAYS AND MOTOR ROADS.
Chief, Bureau of Public Roads, Department of Agriculture.

Austin H. MacCormick: PENAL CONDITIONS.
Assistant Superintendent of Federal Prisons, Department of Justice.

Arthur W. Macmahon, Ph.D.: CONGRESS AND LEGISLATION.
Associate Professor of Government, Columbia University.

Ralph Van Deman Magoffin, A.B., Ph.D., LL.D.: ARCHÆOLOGY.
President, Archæological Institute of America, New York University; Member, American Historical Association, American Philological Association.

Roy Malcom, A.M., Ph.D.: SPHERES OF AMERICAN INFLUENCE.
Professor of Political Science, University of Southern California.

Arthur Richmond Marsh, A.B.: PUBLIC CONTROL OF FUTURES TRADING.
Member, New York Cotton Exchange; President and Treasurer, The Chronicle Company.

Thomas O. Marvin, B.D.: THE TARIFF.
Chairman, United States Tariff Commission.

Kirtley F. Mather, B.Sc., Ph.D.: EARTHQUAKES AND VOLCANOES.
Associate Professor of Physiography and Chairman, Department of Geology and Geography, Harvard University; Geologist, U. S. Geological Survey; Fellow, Royal Geographical Society.

John M. Matthews, A.B., Ph.D.: STATE GOVERNMENT AND INTERNATIONAL AFFAIRS.
Professor of Political Science University of Illinois; Member, American Political Science Association, American Society of International Law.

Mildred E. Mathias: BOTANY.
Missouri Botanical Garden, St. Louis.

A. W. McKay: MARKETING.
Marketing Economist, Department of Agriculture.

Walter Wallace McLaren, M.A., Ph.D.: INSTITUTE OF POLITICS.
Brough Professor of Economics, Williams College; Executive Secretary, Institute of Politics.

Bennet Mead: CRIME CONDITIONS.
Specialist in Social Statistics, Bureau of the Census, Department of Commerce.

A. James Miller, M.D.: PATHOLOGY.
Professor of Pathology and Bacteriology, University of Louisville.

John A. Miller, Jr., Ph.B.: ELECTRIC RAILWAYS.
Managing Editor, *Electric Railway Journal;* Member, American Electric Railway Association; Associate Member, American Society of Civil Engineers.

William A. Moffett: NAVAL AERONAUTICS.
Rear Admiral, U.S.N.; Chief, Bureau of Aeronautics, Navy Department.

John R. Mohler, V.M.D., D.Sc.: Diseases and Pests of Animals.
Chief, Bureau of Animal Industry, Department of Agriculture; Member, Society of American Bacteriologists, American Veterinary Medical Association.

Helen C. Monchow: Land Titles.
Research Assistant Institute for Research in Land Economics and Public Utilities, Chicago.

Charles C. Moore: Public Lands.
Commissioner of the General Land Office, Department of the Interior.

Arthur E. Morgan: Mississippi Flood Control.
President, Antioch College.

Carleton C. Murdock, A.M., B.S., Ph.D.: Physics.
Professor, Department of Physics, Cornell University.

T. F. Murphy, M.D.: Vital Statistics.
Chief Statistician for Vital Statistics, U. S. Bureau of the Census.

Denys P. Myers: Treaties.
Director of Research, World Peace Foundation, Boston.

J. D. Nevius: Administration of the Tariff.
Deputy Commissioner of Customs, Department of the Treasury.

Mabel Newcomer, Ph.D.: Income and Inheritance Taxes.
Professor of Economics, Vassar College.

G. Kingsley Noble, Ph.D.: Organic Evolution.
Curator of Herpetology and Experimental Biology, American Museum of Natural History.

William F. Notz, B.A., M.A., Ph.D.: Control of Production.
Dean, School of Foreign Service, Georgetown University.

Amer B. Nystrom: Dairying.
Bureau of Dairying, Department of Agriculture.

H. M. Olmsted: Municipal Ownership; Public Utility Mergers.
Associate Editor, *The American City*.

Francis LeJau Parker: Territories and Possessions.
Brigadier General, U.S.A.; Chief, Bureau of Insular Affairs, War Department.

George K. Pratt, M.D.: Mental Hygiene.
Assistant Medical Director, National Committee on Mental Hygiene.

Lewis Radcliffe: Fisheries.
Deputy Commissioner, Bureau of Fisheries, Department of Commerce.

W. H. Rastall: American Machinery.
Chief, Industrial Machinery Division, Bureau of Foreign and Domestic Commerce, Department of Commerce.

A. Duncan Reid: Casualty and Miscellaneous Insurance.
President, Globe Indemnity Company, Newark.

Calvin W. Rice, S.B., D.Eng.: Mechanical Engineering.
Secretary, American Society of Mechanical Engineers; Fellow, American Institute of Electrical Engineers; Member, Institute of Electrical Engineers (London); Honorary Member, Koninklijk Institut van Ingenieure.

Bernard G. Richards: Judaism.
Executive Secretary, American Jewish Congress.

A. A. Roback: Philosophy.
University Extension Lecturer, Commonwealth of Massachusetts.

Leland Rex Robinson: Investment Trusts.
President, Second International Securities Corporation, New York.

William Ledyard Rodgers: The Navy.
Rear Admiral, U.S.N.; Member, American Philosophical Society.

John C. Rolfe, A.B., A.M., Ph.D.: Latin Literature.
Professor of Latin Language and Literature, University of Pennsylvania; Member, American Philological Association.

Beatrice Sawyer Rossell: Libraries.
Publicity Assistant, American Library Association.

Arthur M. Schlesinger, B.A., M.A.: American Historical Literature.
Professor of History, Harvard University; Fellow, Royal Historical Society (Great Britain); Member, American Association of University Professors.

L. Seth Schnitman, Ph.B., LL.B.: CONDITIONS IN MANUFACTURING.
Chief, Division of Survey of Current Business, U. S. Bureau of the Census.

William M. Schuyler: NATIONAL GOVERNMENT.
Associate Editor, *The American Year Book.*

William R. Shands: PROTECTION OF SECURITIES.
Director, Securities Division, Virginia State Corporation Commission.

E. W. Sheets, B.Sc., M.S.: LIVESTOCK.
Chief, Animal Husbandry Division, Bureau of Animal Industry, Department of Agriculture.

Preston King Sheldon: WATERWAYS AND HARBORS.
Lieut. Commander, New York Junior Naval Militia; Editor and Writer.

Francis H. Sisson, A.B., LL.D.: NATIONAL AND ALLIED DEBTS.
Vice President, Guaranty Trust Company of New York; Member, American Economic Association, Academy of Political Science in the City of New York.

Bancroft Walker Sitterly, A.B., A.M., Ph.D.: ASTRONOMY.
Assistant Professor of Astronomy, Wesleyan University; Member, American Astronomical Society, American Association for the Advancement of Science; Fellow, Royal Astronomical Society.

W. W. Skinner: AGRICULTURAL CHEMISTRY.
Assistant Chief, Chemical and Technological Research, Bureau of Chemistry, Department of Agriculture.

Sumner H. Slichter: EMPLOYMENT.
Professor of Economics, Cornell University; Member of the Staff, Institute of Economics of the Brookings Institution.

Herbert A. Smith, Ph.D.: FORESTRY.
Assistant Forester, U. S. Forest Service.

Peter F. Snyder: IMMIGRATION PROBLEMS.
Assistant to the United States Secretary of Labor.

Ethelbert Stewart: LABOR CONDITIONS.
Commissioner of Labor Statistics, Department of Labor.

Percy G. Stiles, M.D.: PHYSIOLOGY.
Professor of Physiology, Harvard University Medical School.

Carl W. Stocks: MOTOR BUS SERVICE.
Editor, *Bus Transportation*, New York.

Wendell M. Strong, Ph.D., B.A., M.A., LL.B.: LIFE INSURANCE.
Associate Actuary, Mutual Life Insurance Company, New York.

Graham H. Stuart, Ph.D.: LATIN-AMERICAN RELATIONS.
Professor of Political Science, Stanford University.

E. H. Sturtevant: INDO-EUROPEAN LINGUISTICS.
Professor, Department of the Classics, Yale University.

Ambrose L. Suhrie, A.M., Ph.D., LL.D.: PROFESSIONAL EDUCATION.
Professor, Teachers-College and Normal-School Education, New York University.

Arthur Sweetser, A.B., A.M.: LEAGUE OF NATIONS AND WORLD COURT.
Author; Member, Secretariat of the League of Nations.

Wiley H. Swift: CHILD LABOR.
Acting General Secretary, National Child Labor Committee, New York.

Hugh S. Taylor, Ph.D.: INORGANIC AND PHYSICAL CHEMISTRY.
Professor of Physical Chemistry, Princeton University.

William A. Taylor, V.S., D.Sc.: HORTICULTURE.
Chief, Bureau of Plant Industry, Department of Agriculture.

Scott Turner: COPPER.
Director, U. S. Bureau of Mines.

Leon E. Truesdell: POPULATION STATISTICS.
Chief Statistician for Population, Bureau of the Census, Department of Commerce.

Burton M. Varney: METEOROLOGY.
Associate Professor of Geography, Department of Meteorology, University of California at Los Angeles.

C. Laurence Warwick, B.Sc., C.E.: MATERIALS OF ENGINEERING.
Secretary-Treasurer, American Society for Testing Materials.

Clyde Cannon Webster, Ph.D.: ROMANCE LANGUAGES AND LITERATURE.
Instructor in Romance Languages and Tutor in the Division of Modern Languages, Harvard University.

Warren Reed West: DISTRICT OF COLUMBIA.
Associate Professor of Political Science, George Washington University.

Joseph Henry Wheat: FEDERAL SURVEYS AND MAPS.
Secretary, Federal Board of Surveys and Maps, Department of the Interior.

Herbert P. Whitlock, C.E.: MINERALOGY AND PETROGRAPHY.
Curator of Mineralogy, American Museum of Natural History.

Margaret de Forest Hicks Williams: THE UNITED STATES FOREIGN SERVICE.
Author and Specialist in International Affairs.

Elbert Vaughan Wills, A.B., A.M., Ph.D.: EDUCATIONAL RESEARCH.
Editor-in-Chief, U. S. Navy Department, *Standard Stock Catalogue;* Member, American Historical Association.

George Grafton Wilson: PAN-PACIFIC CONFERENCE.
Professor of International Law, Harvard University.

G. Lloyd Wilson, A.B., M.A., M.B.A., Pr.D., LL.B.: RAILROAD TRAFFIC.
Professor of Commerce and Transportation, University of Pennsylvania.

Clark Wissler, A.B., A.M., Ph.D.: ANTHROPOLOGY AND ETHNOLOGY.
Curator, American Museum of Natural History.

G. F. Wittig: ELECTRIC LIGHTING AND POWER.
Statistical Editor, *Electrical World.*

Austin M. Wolf: AUTOMOTIVE ENGINEERING.
Member, Society of Automotive Engineers.

Clinton Rogers Woodruff, A.B., LL.B., Ph.D.: CIVIL SERVICE; MUNICIPAL GOVERNMENT.
Member, Pennsylvania Bar; Honorary Secretary, National Municipal League; Editor, *National Municipal Review.*

THE AMERICAN YEAR BOOK

THE
AMERICAN YEAR BOOK

A RECORD OF EVENTS AND PROGRESS

PART ONE
HISTORICAL

DIVISION I
AMERICAN POLITICAL HISTORY

CONGRESS AND ITS FUNCTIONS

By Arthur W. Macmahon

Associate Professor, Columbia University

SPECIAL SESSION, SEVENTY-FIRST CONGRESS

The short session of the 70th Congress came to an end March 4. Its course throughout had been influenced by Mr. Hoover's intimation that a special session would be called. The Senate, as constituted in the 71st Congress, convened at noon March 4, withdrew to hear the inaugural address, and met briefly on the following day to confirm the appointment of the eight new members of the Cabinet. At the same time it instructed the Committee on Judiciary to inquire and report: "1. Whether the head of any department of the Government may legally hold office as such after the expiration of the term of the President by whom he was appointed. 2. Whether in view of the provisions of the laws of the United States Andrew W. Mellon may legally hold the office of Secretary of the Treasury. . . ." In anticipation of the approaching special session the House committee on ways and means held hearings between Jan. 7 and Feb. 25. Not only this committee but also the committees on agriculture in both houses were expressly authorized to act between the adjournment of the 70th Congress and the opening of its successor. Hearings on farm relief began on the Senate side March 25 and on the House side March 27. The special session started formally April 15 and adjourned Nov. 22. This period was broken by a recess, however, and during the fall only the Senate functioned actively. When the original recess was taken June 19 (under S. Conc. Res. 16, agreed to June 18), it was provided that the Senate should resume Aug. 19 and the House Sept. 23, although confining itself to perfunctory, momentary meetings on Mondays and Fridays until Oct. 14. In view of the protracted discussion of the tariff in the Senate, the arrangement by which the House marked time was renewed Oct. 14 and again Nov. 11. The regular, or second, session of the 71st Congress assembled Dec. 2, recessing for the holidays Dec. 21.

PARTY GROUPS

Senate Membership.—The lengthened lead won in 1928 seemed, on the surface, to assure a greater degree of partisan control than the majority had enjoyed for years. Even without Mr. Vare, the Republicans numbered 55, against 39 Democrats and a single Farmer Labor member. The case of the Pennsylvania senatorship was not disposed of until December and even then under circumstances that left an unanswered although not very doubtful question. Sept. 9 Senator Norris offered a resolution (S. Res. 111) denying to William S. Vare the right to sit in the Senate. It was agreed that action on this should be postponed until early in the regular session. Dec. 5 a belated report (S. Rept. 47) regarding the contest brought by William B. Wilson, the Democratic candidate, was submitted by the Committee on Privileges and Elections, in which it expressed the view (reached by a vote of 7 to 4) that Mr. Vare had been legally elected. The Norris resolution was adopted Dec. 6 by a vote of 58 (25 Rep., 32 Dem., 1 Farmer Labor) to 22 (all Rep.). At the same time, by 66 to 15 (5 Rep., 10 Dem.), the Senate declared (S. Res. 177) that Mr. Wilson had not been elected. The vacancy thus finally created was filled Dec. 11 by the appointment of Joseph R. Grundy, president of the Pennsylvania Manufacturers' Association. The oath was administered the following day, after Senator Nye's resolution (S. Res. 185) denying his right to a seat had been referred to the Committee on Privileges and Elections.

Senate Leadership.—No outward disturbances attended the choice of party leaders. At a conference March 5 the Democrats reëlected Senator Robinson, Arkansas, as floor leader and Senator Walsh, Montana, as vice chairman of the conference and assistant leader. Key Pittman, Nevada, was chosen whip in place of Mr. Gerry, Rhode Island, who had been defeated in 1928. On the same day the Republican conference faced a problem of selection created by the elevation of Mr. Curtis to the Vice Presidency. Senator Watson, Indiana, who had been assistant leader, was given the post of leader; Senator Jones, Washington, the former whip and Watson's strongest rival for the leadership, was called the assistant leader. Simeon Fess, Ohio, became whip. Senator McNary, Oregon, chairman of the Republican Committee on Committees, later functioned virtually as an assistant leader, especially during Mr. Watson's indisposition and absence in the closing weeks of the special session. Senator Moses was reëlected president *pro tempore* and was made chairman of the rules committee, and in addition headed the Republican senatorial campaign committee. There was some discussion of his appropriateness in the last-mentioned rôle after publicity was given Nov. 8 to a speech before a business group in which Mr. Moses referred to certain of his colleagues as "sons of the wild jackass" and after the Senate (though not without appreciation of its savor) heard its president *pro tempore* say from the chair that if his critics "can find a more fitting appellation for the gyrating crew that runs the Senate the Senator from New Hampshire will be glad to make use of it."

House Groups and Organization.—The Republican majority of 39 in the 70th Congress was increased to 101 in the 1928 elections,—the largest since 1920. Practically no changes in leadership took place. On the Democratic side, at a conference held March 1, John N. Garner, Texas, ranking minority member of the Committee on Ways and Means, was chosen floor leader in place of F. J. Garrett, who had been an unsuccessful candidate for the Senate. J. McDuffie, Alabama, was made whip. On the Republican side, no major shifts resulted from the party conference March 2. Nicholas Longworth was again its choice for speaker. April 15 he was formally reëlected by 254 votes to 143, with the sole third-party member—Kvale, Minnesota, Farmer Labor—recording himself "present." J. Q. Tilson, Connecticut, continued as floor leader; A.

H. Vestal, Indiana, as whip; and B. Snell, New York, as chairman of the rules committee. The majority steering committee, reconstituted by the filling of two vacancies, consists of J. Q. Tilson, Connecticut; A. T. Treadway, Massachusetts; S. W. Dempsey, New York; F. R. Lehlbach, New Jersey; G. P. Darrow, Pennsylvania; E. E. Denison, Illinois; L. C. Crampton, Michigan (a new member); H. Hoch, Kansas; R. C. Johnson, South Dakota, and L. H. Hadley, Washington (the other new member). The traditional methods of determining committee assignments were followed. Except for the Committees on Ways and Means, Agriculture, Rules, Enrolled Bills, and Printing—all chosen at the outset of the special session, and the Committee on Appropriations, constituted Nov. 11—the election of the standing committees of the House was deliberately postponed until the beginning of the regular session. In this respect the House differed from the Senate, which operated throughout with a full set of committees, although the process of reassignment—involving some troublesome vacancies to which Progressive-Republicans were claimants on the basis of seniority—went over to the new year.

SCOPE OF THE SPECIAL SESSION

In his inaugural address the President remarked: "Action upon some of the proposals upon which the Republican Party was returned to power, particularly further agricultural relief and limited changes in the tariff, cannot in justice to our farmers, our labor, and our manufacturers be postponed. I shall therefore request a special session of Congress for the consideration of these two questions." In his message April 16 he said in part: "I have called this special session of Congress to redeem two pledges given in the last election—farm relief and limited changes in the tariff." In closing, he indicated by a bare reference that he favored the consideration of "certain matters of emergency legislation that were partially completed in the last session, such as the decennial census, the reapportionment of congressional representation, and the suspension of the national-origins clause of the immigration act of 1924, together with some minor administrative authorizations." The measure that established the Federal Farm Board and the dual act that provided for future House reapportionments and for the census of 1923 were the only major enactments actually passed between April and November. The interest of the proceedings of Congress during that period cannot be judged by the shortness of the list. Even a longer, regular session would be rendered notable by the final passage of the act that the President pronounced "the most important measure ever passed by Congress in aid of a single industry." Seldom in recent years, moreover, have the moving forces in national politics been more vividly revealed than in the hearings, debates, and investigations attendant on the consideration of the tariff, still in full swing at the close of the year.

THE "COALITION" AND FARM RELIEF

Farm Relief in the House.—It can hardly be said that, at bottom, the Administration had its way with farm relief. The truth probably is that six years of constant agitation, of shrewd negotiation, and of careful drafting, together with the exigencies of the campaign, made it necessary for the Republican candidate to commit himself to a piece of legislation which, even when stripped of the equalization fee, was a doubtful adventure in the direction of rugged individualism. Subject to this qualification, the House was the President's loyal servant. The terms of the agricultural marketing bill (H. R. 1) were agreed to by the committee April 14; the vote was said to have been 19 to 2. By means of a special rule adopted April 18, the House quickly brought the general debate to a close and April 25 passed the bill substantially unchanged by a vote of 366 to 35 (2 Rep., 33 Dem.).

The Senate and Debentures.—Meanwhile a companion bill had been before the Senate committee on agriculture. Controversy centered in the proposal to authorize the issuance of export debentures on farm products. In the face of the President's emphatic disapproval, expressed in a letter to Chairman McNary April 20, the committee decided by a vote of 8 (3 Rep., 4 Dem., 1 Farmer Labor) to 6 (4 Rep., 2 Dem.) to keep the debentures provision in the bill. The crucial roll-call in the Senate came May 8 when Senator Watson moved to strike out the section. Forty-seven senators —(13 Rep., 34 Dem.) voted against the motion, which received the support of 44 (42 Rep., 2 Dem.). Still carrying the provision for debentures, the bill passed the Senate May 14 by an even larger margin—54 (21 Rep., 33 Dem.) to 33 (31 Rep., 2 Dem.). In the form it took at this stage, the debentures plan was optional. The farm board was empowered in its discretion to direct the Treasury to issue debentures to the exporters of certain agricultural products; these were acceptable in payment of customs duties. The rate of the export bounty was to be half the tariff rate; that on cotton was set at two cents a pound. It was stipulated, moreover, that if production increased the bounty rate would fall in accordance with a fixed scale.

The Farm Relief Bill in Conference.—The House leaders were anxious to avoid delay so they hesitated to return the bill to the Senate on the constitutional ground (a debatable one, it must be said) that the debentures amendment concerned revenue and could not originate in the Upper House. They seemed equally anxious to avoid a record vote on debentures. The way out was sought by a special rule, adopted May 17 by 249 (235 Rep., 14 Dem.) to 119 (4 Rep., 115 Dem.), under which the House disagreed and asked for a conference while expressly disclaiming that this action was to be construed as a precedent. Yielding to the obduracy of the House managers and to the implied threat of a veto, the Senate conferees assented to the elimination of the section on debentures. The House accepted the report without a vote. The Senate, however, rejected it June 11; the division was 43 (39 Rep., 4 Dem.) to 46 (13 Rep., 32 Dem., 1 Farmer Labor). A direct vote on debentures in the House was thus made nearly unavoidable. The representatives of the House were instructed to insist on striking out the provision for debentures. This action was taken by a vote of 250 (217 Rep., 33 Dem.) to 113 (13 Rep., 100 Dem.). June 14 the conference report that the Senate had previously rejected was agreed to by a vote of 74 (47 Rep., 27 Dem.) to 8 (3 Rep., 5 Dem.). The agricultural marketing act was signed by the President June 15.

THE "COALITION" AND THE TARIFF

House Action.—The customary methods of partisan control were adopted. The bill (H. R. 2667) was drafted by the Republican members of the ways and means committee, organized for purposes of specialization in a number of sub-committees. The measure was introduced by Chairman Hawley May 7. Two days later it was passed through the whole committee by a strictly party vote. The Republican leaders originally planned to secure the immediate adoption of a special rule by which general debate could be limited and rigorous control during the hazardous amending stage could be vested in the majority members of Ways and Means. With this in view a Republican conference was announced for May 10. Before that time, however, so much individual dissatisfaction was manifested within the party that wisdom prompted a course of temporizing and conciliation. No definite action was taken by the conference May 10. Republican malcontents were allowed to appear privately before the majority members of the Committee on Ways and Means. At a second conference May 23 about 90 proposed committee amendments were submitted and approved. The conference endorsed the adoption of a "gag rule" by which general debate would be closed at once and consideration under the five-minute rule terminated May 28, with priority throughout for committee amendments and with the final vote to be on the amendments *en gros*. The House tied this muzzle on itself May 24 by a vote of 234 (229 Rep., 5 Dem.) to 138 (12 Rep., 125 Dem., 1 Farmer Labor). Four days later the bill was passed, receiving 264 votes (244 Rep., 20 Dem.) to 147 (12 Rep., 134 Dem., 1 Farmer Labor).

Senate Action.—What came to be called the "coalition" was defeated in the first open skirmish, when, June 17, Borah's resolution proposing that revision should be restricted to the agricultural schedule failed by 38 (13 Rep., 25 Dem.) to 39 (32 Rep., 7 Dem.). The allies were able to force the Finance Committee to hold public hearings between June 12 and July 10. In accordance with custom the Democrats were excluded in the redrafting of the bill. The seriousness of the Republican rift even in the committee was evidenced in the fact that practically every important controversial point was decided by a vote of 6 to 5. The revised commodity schedules were made public Aug. 19. Chairman Smoot stated that 431 changes had been made in the House bill, of which 177 were increases, 254 decreases. Senator Borah, however, was quoted as saying: "there is very little difference between the two bills so far as they affect agriculture." Sept. 3 a nucleus of dissident Republicans—Borah, Norris, LaFollette, Blaine, Brookhart, Howell, McMaster, Frazier and Nye—began the practice of almost constant group consultations. Close though informal contacts were maintained with the Democratic leaders. Various shades of defeatism appeared on the Republican side. Oct. 31 Senator Reed, Pennsylvania, exclaimed: "The Coalition—that is, the great majority of Democratic senators here and the dozen or 14 Republicans who think with them—are in actual charge of the bill." Believing that "the majority of the Senate is in complete, diametric disagreement with the majority of the House of Representatives," he declared that the bill was virtually dead. The coalition had no desire to let it die. They welcomed the opportunity to strike not only at proposed changes but also at what they regarded as inequities in the tariff of 1922. The debate was wholesome, they argued with much reason, and was not unduly protracted in view of the time ordinarily required for tariff revision.

Nov. 14 a group styled "young Republicans" began to attract public attention. They were friendly to the Administration. Action was their avowed purpose, and at the time they helped to upset the plans of the floor leaders by temporarily defeating the resolution for adjournment Nov. 23. In the end they did not seem to have affected materially the control of the Senate. Meanwhile the President's formal statement Sept. 24 "that the flexible tariff, through recommendation by the Tariff Commission to the Executive, should be maintained," and his other notable press announcement Oct. 31 urging that the Senate "send the bill to conference . . . within the next two weeks" studiously avoided a discussion of relative rates and did not help in resolving the main controversy.

The controversy was in general a matter of emphasis and turned on the question of protection of raw materials, including farm products *versus* protection of finished manufactures. The coalition was frequently grieved because the committee had put duties too low, as in the case of casein, raw wool, or manganese. Even if space did not forbid it would be premature to attempt to summarize the results of the many roll calls taken in the consideration of the eleven rate schedules (of the total of 15) acted upon before the end of the special session. The strength of the coalition may be judged from certain votes that affected the special or administrative phases of the bill. Oct. 2 the President's power to change tariff rates was withdrawn by 47 (13 Rep., 34 Dem.) to 42 (38 Rep., 4 Dem.). Oct. 7 the existing methods of determining values were restored by 44 (11 Rep., 33 Dem.) to 37 (36 Rep., 1 Dem.). Oct. 17 provision was added for a "consumers' counsel," attached to the legislative branch, by a vote of 66 to 11 (the latter all Republicans). Most provocative of all, the debentures rider was fixed to the bill Oct. 19 by

42 (14 Rep., 28 Dem.) to 34 (31 Rep., 3 Dem.).

INVESTIGATIONS

Shearer Inquiry.—The Senate coalition was aided by some occurrences which they were able to use to excite public suspicion of organized industrial interests. The first of these did not concern the tariff. Sept. 11 a resolution (S. Res. 114) was unanimously adopted directing the committee on naval affairs to investigate "the alleged activities at the Geneva naval conference and at the other meetings of the preparatory commission" of W. B. Shearer, who had attracted attention by suing the shipbuilding companies in whose behalf he had acted. Hearings were held before a subcommittee headed by Senator Shortridge of California but in mid-October the completion of the inquiry was shelved until the new year.

Lobbying Probe. — Meanwhile a more sweeping investigation of lobbying was begun by a subcommittee of the Senate Committee on Judiciary, consisting of Caraway, Arkansas, chairman, and Walsh, Montana—both Democrats—and Borah, Blaine and Robinson, Indiana, under authority of S. Res. 20 unanimously agreed to Oct. 1. An early witness was Senator Bingham, Connecticut, whose use of coöperation by the officials of the manufacturers' association of his state was stigmatized in the course of the tariff debate Sept. 25. Nov. 4 a resolution offered by Senator Norris (S. Res. 146) was adopted by a vote of 54 (22 Rep., 32 Dem.) to 22 (all Rep.); it declared that Mr. Bingham's action "in placing Mr. Charles L. Eyanson upon the official rolls of the Senate" was "contrary to good morals and senatorial ethics . . ." Hearings before the subcommittee were held almost continuously from Oct. 15 until the end of the year; parts of its report (S. Rept. 43) were submitted from time to time.

SIGNIFICANT FEDERAL LEGISLATION

By Arthur W. Macmahon

Associate Professor, Columbia University

CENSUS AND REAPPORTIONMENT OF HOUSE

The bulk of Public No. 13, approved June 18, is devoted to provisions for a decennial "census of population, agriculture, irrigation, drainage, distribution, unemployment, and mines" in 1930 and thereafter. Section 22 of the foregoing act provides for future reapportionments of the membership of the House of Representatives, which will continue to be 435. The Senate deadlock in the 70th Congress was broken May 24 when the motion to strike out the provision for reapportionment was rejected by 38 (9 Rep., 29 Dem.) to 45 (40 Rep., 5 Dem.). In the House it was jeopardized by the temporary adoption of two conflicting amendments. One, offered by Tinkham, Massachusetts, proposed that the census should include the discovery of the numbers of citizens over 21 "whose right to vote . . . has been denied or abridged except for rebellion or other cause." An analagous amendment had been defeated in the Senate May 28 by 29 (11 Rep., 18 Dem.) to 48 (37 Rep., 11 Dem.). It prevailed in the House, however, by 145 to 118. June 4 also an amendment excluding unnaturalized aliens as a basis for House apportionment passed by 183 to 123. An impasse was avoided by adroit parliamentary tactics; June 6 an amendment offered by the leader, which eliminated both of the controversial items, was accepted. The bill passed the House the same day by 271 (193 Rep., 79 Dem.) to 104 (43 Rep., 61 Dem.). It provides that at the beginning of the second regular session of the 71st Congress (Dec., 1930) and of every fifth Congress thereafter the President shall submit to Congress a statement showing the number of representatives to which each state is entitled according to the following methods of calculation: "the method used in the last preceding apportionment"; "the method known as the method of major fractions"; and "the method known as the method of equal proportions." If that Congress fails to enact a law for reapportionment, it is effected automatically in accordance with the calculation by "the method used in the last preceding apportionment." Altogether a shift of 23 seats seems likely to result from the next reapportionment. Seventeen states will probably lose: Maine, Vermont, Massachusetts, New York, Pennsylvania, Virginia, Tennessee, Alabama, Louisiana, Kansas, Nebraska, and North Dakota—1 each; Indiana, Iowa, Kentucky, and Mississippi—2 each; and Missouri, 3. Eleven states expect to gain: Connecticut, North Carolina, Florida, Oklahoma, Arizona, and Washington—1 each; New Jersey and Texas—2 each; Ohio, 3; Michigan, 4; and California, 6.

FARM RELIEF

Agricultural Marketing Act.—The outstanding enactment of the year was Public No. 10, approved June 15, establishing the Federal Farm Board. This body consists of 8 members appointed by the President with the consent of the Senate for six year terms at a salary of $12,000 annually. The appropriation of a revolving fund of $500,000,000 is authorized. The board may institute advisory commodity committees and, on their application, recognize stabilization corporations, to which it may "make loans from the revolving fund . . . to enable the corporation to control any surplus . . . and for meeting, carrying and handling charges and other operating expenses." It is provided that loans to coöperatives or stabilization corporations "shall bear interest at a rate of interest per annum equal to the lowest rate of yield . . . of any Government obligation bearing a date of issue subsequent to April 6, 1917 (except postal savings bonds. . . ." The Board is authorized to "enter into agreements . . . for the insurance of the coöperative associations against loss through price decline. . . ." Public No. 15, approved June 18, appropriated $150,000,000 of the authorized revolving fund and $1,150,000 for operating expenses.

Control of Insect Pests.—Public Resolution No. 1, approved May 1, made available for fighting the Mediterranean fruit fly in the United States not more than $4,250,000 of the unexpended balance of an appropriation originally made to establish cotton-free zones. Public Resolution No. 29, approved Dec. 21, appropriated an additional $1,290,000.

Aid in Flood Areas.—Public Resolution No. 92, 70th Congress, approved Feb. 25, authorized a loan of $6,000,000 for relief of farmers in the southeastern states. Public Resolution No. 2, approved May 17, made this applicable to storms that have happened in the meantime and authorized "loans and advances to vegetable and fruit growers for the fall and winter crop of 1929-1930 to an amount not exceeding $25 per acre. In the lower Mississippi valley, Public No. 843, 70th Congress, approved Feb. 28, appropriated $3,654,000 to aid in restoring roads and bridges. Public No. 8, approved June 13, provides that the appropriation to aid in rehabilitation of farm lands in the flood areas, originally made Jan. 26, 1928, shall remain available during the fiscal year 1930.

NAVAL LEGISLATION

Cruiser Construction.—Public No. 726, 70th Congress, approved Feb. 13, authorizes the President "to undertake prior to July 1, 1931, the construction of 15 light cruisers and one air-craft carrier," to be laid down at the rate of five per year, the cost of each cruiser being limited to $17,000,000, and the whole being subject to the proviso that "in the event of an international agreement, which the President is requested to encourage, for the further limitation of naval armament, to which the United States is signatory, the President is hereby empowered to suspend in whole or in part any of the naval construction authorized under this act."

Naval Conference.—Public Resolution No. 27, approved Dec. 18, appropriated $200,000 for the expenses of the conference in London early in 1930.

REGULATION OF COMMERCE

Radio.—Public No. 1029, 70th Congress, approved March 4, stated that the Radio Commission should continue with full powers until Dec. 31, 1929. Now it is provided by Public No. 25, approved Dec. 18, that all powers under the Radio Act of 1927, as amended, "shall continue to be vested in and exercised by the commission until otherwise provided by law."

Navigation.—The Secretary of Commerce is authorized to set load lines for vessels over 250 tons (except on the Great Lakes) under the broad terms of Public No. 934, 70th Congress, approved March 2.

Convict Labor Goods.—Public No. 669, 70th Congress, approved Jan. 19 (the "Cooper-Hawes Act") provides that after five years any goods, etc., produced by convict labor shall, upon transportation into any state, be subject to its laws as if made there.

PROHIBITION

Public No. 899, 70th Congress, approved March 2 (the "Jones Act"), increases the penalties for each violation of the National Prohibition Act to "a fine not to exceed $10,000 or imprisonment not to exceed five years, or both," with the proviso "that it is the intent of Congress that the Court . . . should discriminate between casual or slight violations and habitual sales of intoxicating liquor, or attempts to commercialize violations of the law."

FINANCE

Foreign Debts.—Public No. 747, 70th Congress, approved Feb. 14, settled Greece's indebtedness while arranging a new loan of $12,167,000 at 4 per cent to assist in the work of the Greek Refugé Settlement Commission. Public No. 24, approved Dec. 18, assents to the settlement of the indebtedness of the French Republic in accordance with the Mellon-Berenger agreement (S. Doc. 102, 69th Congress). The amount to be funded is $4,025,000,000. This practically completes the series of debt settlements.

Tax Reduction.—As an excitant to offset incipient depression, Public Resolution No. 23, approved Dec. 16, cut the income tax rates on 1929 incomes, the normal tax on individuals and trusts and estates being reduced from 1½%, 3%, and 5% to ½ of 1%, 2%, and 4%, respectively, and the tax on corporations from 12% to 11%.

PUBLIC BUILDINGS

Supreme Court.—Public No. 26, approved Dec. 20, endorses the execution of the plan of the United States Supreme Court Building Commission on a site adjacent to the Capitol grounds and authorizes the appropriation of $9,740,000 for the purpose.

Municipal Center.—Public Resolution No. 15, approved June 15, appropriated $3,000,000 for the acquisition of a site for a municipal center in the District of Columbia.

Veterans' Hospitalization.—Public No. 29, approved Dec. 23, authorizes the appropriation of $19,950,000 to provide additional hospital, domiciliary, and out-patient dispensary facilities for persons entitled to hospitalization under the World War Veterans Act of 1924.

Penal Institutions.—Public No. 672, 70th Congress, approved Jan. 19, authorizes the establishment of two narcotic farms, to be under the direction of the Public Health Service, primarily for United States prisoners but incidentally to care for voluntary patients.

MISCELLANEOUS

The Migratory Bird Conservation Act, Public No. 770, approved Feb. 18, opens the way for the establishment of a comprehensive scheme of inviolate sanctuaries for migratory birds; it authorizes appropriations which will reach the maximum of $1,000,000 annually in 1933 and for 6 years thereafter.

Vocational Education.—Public No. 702, 70th Congress, approved Feb. 5, authorizes an additional appropriation for Federal aid in vocational education, beginning at $500,000 in the present fiscal year and mounting to $2,500,000 annually.

THE PRESIDENT AND HIS POLICIES

By James Hart

Professor, Johns Hopkins University

AN ACTIVE PRESIDENT

It is easier to write of a relatively inert President like Coolidge than of an active President like Hoover. Before his inauguration, he made, as a sort of super-drummer and good-will agent, a visit to eleven Latin American republics. He selected a Cabinet of working assistants who are neither stars nor third-raters. On March 12 he announced a policy of neither selling nor leasing oil lands except by mandatory provision of Congress. He directed an examination of all outstanding oil leases as to compliance of the holders with the law. These acts followed the appointment of an honest and disinterested Secretary of the Interior. Two days later an Executive Order was issued providing publicity of income tax refunds in excess of $20,000, a reversal of the previous Administration's policy. April 22, speaking through Hugh Gibson at Geneva, he inaugurated the movement which culminated in the naval limitation conference in London in January. He called Congress for April 15 to to carry out his campaign pledges, and through party control in the House forced the Senate to abandon its debenture plan for farm relief. He appointed a law enforcement commission of distinguished citizens, and April 22 made a vigorous plea for law observance. May 19 he called a White House conference of leaders looking toward modification of American claims against Germany, to aid in the reparations decision. August 26 he suggested the transfer of over 200,000,000 acres of public lands to the states, which would then be responsible for irrigation and reclamation; and Oct. 17 named James A. Garfield chairman of his commission on conservation and the public domain. In September he vigorously denounced propaganda of the Shearer variety against naval reduction, and called for a complete investigation of the matter. In October he came out against political appointments in a letter to the Republican committee of Florida. Oct. 23 he outlined a five-year plan for the development of inland waterways. In November he attracted world attention by his proposal on freedom of the seas. After the stock market crash, he set to work, through conferences, to stabilize the nation's business, maintain purchasing power, and prevent a depression. He insisted on keeping army expenses at a minimum, and recommended a further tax cut. This list is by no means exhaustive; but it shows us a President with an "active mind."

GOVERNMENT BY COÖPERATION UNDER GOVERNMENT LEADERSHIP

Hoover's Political Creed.—A significant aspect of Mr. Hoover's political philosophy is expressed in his Inaugural: "Our people have in recent years developed a new-found capacity for coöperation among themselves to effect high purposes in public welfare. It is an advance toward the highest conception of self-government. Self-government does not and should not imply the use of political agencies alone. Progress is born of coöperation in the community, not from governmental restraints. The government should assist and encourage these movements of collective self-help by itself coöperating with them." This is the key to the "Hoover idea," and that it is not mere rhetoric has been demonstrated by the man in action.

The Man and the Office.—In his hands, the Presidency is not merely a political office, but also a focal point of voluntary collective action. Economics is naturally stressed; and the official becomes not solely the policeman, but the economic and sociological adviser of the community. Mr. Hoover's rejection of "state" socialism in connection with farm relief and power problems keeps business men tied to him, while he goes ahead with vast plans for what John W. Burgess used to call "voluntary" socialism. The Hoover leadership is seldom dramatic; the President lacks the ability to exploit publicity to the fullest. His is a work-a-day, matter-of-fact leadership, effective if not colorful. It is a distinctive contribution to the presidential office; though, like that of Roosevelt and of Wilson, it has its limitations.

ECONOMIC POLICIES

Sociological Outlook.—This sociological outlook the President stresses as the broader purpose behind his economic policies: "The large purpose of our economic thought," he declared in his Inaugural, "should be to establish more firmly stability and security of business and employment, and thereby remove poverty still further from our borders." And again: "We have need further to perfect the means by which government can be adapted to human service,"—"in the systematic development of those processes which directly affect public health, recreation, education and the home."

GOVERNMENT BY COMMISSION

Problems are nowadays so technical that they can no longer be dealt with by amateur politicians, even when the latter are also business men; and these problems are so manifold that they cannot be intelligently passed upon, except in their broader phases, by the President. Hence, a corollary of the "Hoover idea" is government by commission. This was his method for handling the farm relief and law enforcement problems, and for many other matters of less dynamic political significance. It is significant, for example, that his annual message suggested the substitution of full time in place of *ex officio* commissioners on the Federal Power Commission—thus carrying out the "Hoover idea."

It is idle to criticize the President for having no nostrums to cure our ills. The very idea of ready-made and final "solutions" is itself a survival of the conception of society as something simple and static. Mr. Hoover's mind is essentially a Twentieth-Century mind. He is at his best in a round-table conference on practical ways and means. Hence, he naturally has faith in the conference idea, and in the board of experts as an agency of investigation, advice or regulation. Within a wide range of problems this idea is undoubtedly sound. Results, however, are long-run, and cannot be judged except after a period of time. His is the initiative and the broad survey of problems; the details must be worked out by others on a trial and error basis.

LAW ENFORCEMENT

In his inaugural address, Mr. Hoover held that "if citizens do not like a law, their duty is to discourage its violation; their right is openly to work for its repeal"; and that "our whole system of self-government will crumble either if officials elect what laws they will enforce or citizens elect what laws they will support." Disobedience of law he declared to be "the most malign danger" besetting us to-day. For this the burdens of enforcement due to the Eighteenth Amendment are only partly responsible. "There would be little traffic in illegal liquor if only criminals patronized it. We must awake to the fact that this patronage from large numbers of law-abiding citizens is supplying the rewards and stimulating crime. . . . The measure of success that the Government shall attain will depend upon the moral support which you as citizens extend. . . ." He thereupon announced his intention of appointing "a national commission for a searching investigation of the whole structure of our Federal system of jurisprudence, to include the method of enforcement of the Eighteenth Amend- and the causes of abuse under it." In his Associated Press address, April 22, Mr. Hoover stressed this question as "the dominant issue before the American people." May 20 the personnel of the law enforcement commission, to be headed by Mr. Wickersham was announced. June 6 the President in a special message, asked Congress to appoint a joint committee to study the reorganization of the bureau engaged in prohibition enforcement Oct. 1 he named John McNab to formulate a plan for better enforcement of the prohibition law.

FARM RELIEF

Remedies Suggested.—In his message of April 16 to the special session of Congress, Mr. Hoover said: "I have called this special session of Congress to redeem two pledges given in the last election—farm relief and limited changes in the tariff." Respecting the former, he declared, "there is no single plan or principle that can be generally applied." He suggested as partial remedies improved waterway transportation, tariff readjustment, adjustment of production, and improved marketing; and advocated the creation of a farm board, with a revolving fund for loans to farmer-owned marketing and other agencies, and with the duty of investigating farm problems. "We must not undermine initiative. There should be no fee or tax imposed upon the farmer. No governmental agency should engage in the buying and selling and price fixing of products. . . . No activities should be set in motion that will result in increasing the surplus production." "Every effort of this character is an experiment," but in the farm board we "create an agency through which constructive action for the future will be assured."

The Course of Legislation.—The Senate farm relief bill carried the so-called debenture plan, which the President severely criticized. The House passed a bill without this feature, and in accordance with White House ideas. The Senate retained the debenture plan despite presidential opposition, but the House refused to accept it. A conference being called, the House conferees gave the managers for the Senate an ultimatum, which forced them to yield. The Senate, however, at first refused to accept the conference report. But when the President issued a formal statement and the House again refused to consider the debenture plan, the upper house gave way, and the Administration had won its first great fight in Congress. The President signed on June 15 a farm relief bill embodying his own ideas and carrying out his own plans.

THE TARIFF

Recommendations of President.—The special session, however, got entirely out of hand in the matter of tariff legislation. The President's message made his position clear. Agricultural products should be given adequate protection. For other industries, "there have been economic shifts necessitating a readjustment of some of the tariff schedules." "On the whole" the tariff act of 1922 "has worked well." The President advocated "some limited changes in the schedules and in the administrative clauses," and specifically stated that he considered "the test of necessity for revision is in the main whether there has been a substantial slackening of activity in any industry during the past few years, and a consequent decrease of employment due to insurmountable competition in the products of that industry. It is not as if we were setting up a new basis of protective duties. We did that seven years ago. . . . We must not fail to take into account the broad interests of the country as a whole, and such interests include our trade relations with other countries." The message further recommended that the Tariff Commission be "reorganized and placed upon a basis of higher salaries." He favored the flexible clause, but preferred "a formula . . . that will insure rapid and accurate determination of needed changes." This having been provided, "many secondary changes in tariff can well be left to action by the commission." "Weaknesses on the administrative side . . . especially in the valuations for assessments," also required attention.

Conflict with Congress.—These suggestions Congress proceeded to ignore. The Hawley bill, providing practically a general upward revision of schedules, was passed by the House on May 28. June 17, the Senate by one vote defeated the Borah proposal to limit changes to the agricultural schedules. The Smoot bill was reported to the Senate Sept. 4 and the debate began Sept. 12. Senator Borah criticized the Smoot bill as slighting the farmer. Oct. 2 the Senate voted down the flexible clause, despite the

President's defense thereof a few days before. On the 19th it tacked the debenture plan to the tariff bill, and two days later decisively rejected for a second time limited revision. The control was shifting to a "coalition" of Western "progressive" Republicans and Democrats, while the "regulars" were splitting into the "old guard" and the Hooverite or "new guard." Shortly before the date for the regular session, adjournment took place with no net results. The President had not called for action until it was too late. Even then, he had not flatly demanded the rejection of the Hawley and Smoot bills, probably because this would in effect mean lending his support to the "coalition." His leadership seemed weak, but his own views had been clearly expressed, and it had become politically dangerous if not impossible to do more in leading a Senate that was split four ways. The regular session convened the first Monday in December, only to hear in the Annual Message a re-statement of a position that corresponds more nearly to that of the "coalition" than to that of the "old guard." The new year will prove whether the President or the many special interests will win out.

NAVAL LIMITATION AND REDUCTION

The American Formula.—April 22 the Administration attempted to present, through Hugh Gibson, its representative before the Preparatory Commission of the League of Nations, a "formula" for further naval agreements. This aroused a responsive chord in the Baldwin government. In his Memorial Day Address the President himself surveyed the situation. The next step was so to advertise the conversations between Ambassador Dawes and Premier MacDonald as to create a favorable reaction in both countries. Japan expressed in June her approval of the plans that had been discussed.

The Shearer Episode.—Sept. 6 the President seized the opportunity to condemn propaganda "directed to create international distrust and hate," when it became known that one Shearer had filed suit against shipbuilding corporations for pay for propaganda work alleged to have been done for them at the Geneva conference. He called for a statement by shipbuilding directors, and directed the Attorney General "to consider what action we can take." His statement gave a significant definition of the limits of legitimate propaganda. When a limited Senate investigation was proposed, he said these matters should "be gone into to the very bottom."

Premier MacDonald's Visit. — Premier MacDonald did his share. His government accepted the principle of parity. He came to Washington in October for a personal visit to the President. England invited the four other leading naval powers to a conference in London in January. From Washington MacDonald and Hoover issued a joint statement accepting the Kellogg Pact as "a positive obligation to direct national policy in accordance with its pledge." On the basis of the Pact, they said, "in a new and reinforced sense the two governments not only declare that war between them is unthinkable but that distrusts and suspicions . . . must now cease to influence national policy." Other nations had been kept informed of the conversations. The President desires reduction, not merely limitation. On Armistice Day he said: "We will reduce our naval strength in proportion to any other. . . . It can not be too low for us." That he is keen for success at London is indicated by his selection of that super-negotiator, Dwight W. Morrow, as well as two senators, one the Democratic leader, to accompany Secretary Stimson.

FREEDOM OF THE SEAS

On Armistice Day the President delivered an address which ranks with the state papers of Woodrow Wilson. It embodied a realistic survey of the problem of peace which was at the same time tinctured with constructive idealism. In it he suggested to the world, but not for consideration at London, that the high seas, free in time of peace, be made free in time of war to the extent that "all vessels laden solely with food supplies" be placed "on the same footing with hospital ships." "The fear of an interruption in sea-borne food supplies has powerfully tended toward naval development in both importing and exporting nations. . . . The world must soon or late recognize this as one of the underlying causes of its armed situation, but, far beyond this, starvation should be rejected among the weapons of warfare." This suggestion has been criticized from several angles, but at the least it shows a return to presidential leadership in the cause of peace.

THE PRESIDENT AND THE STOCK MARKET CRASH

The October crash gave the super-executive and exponent of "coöperative" versus "state" socialism the opportunity to play, during November and December, his favorite rôle. He called business conferences. He got a wage truce pledge from business and labor leaders. And under his stimulus big business agreed to form a permanent business council. Plans were also formulated for preventing curtailment in public and private construction work in 1930. If a serious depression is prevented, Mr. Hoover will be still further enthroned in the hearts of business men throughout the nation. If, as Frank Kent contends, "prosperity absorbs all criticism," then upon his success here as nowhere else will the President's prospects for 1932 depend.

THE PRESIDENT'S ANNUAL MESSAGE

This is a 27 page survey of all phases of "the state of the Union," which, in the grasp it shows of national problems and in its numerous constructive recommendations illustrates once more the President in the literal rôle of an "executive" head of the nation. Only a few points can be touched upon here. Regarding American marines on foreign soil, Mr. Hoover said: "In the large sense we do not wish to be represented abroad in such manner." Shortly thereafter circumstances compelled him to dispatch additional marines to Haiti, but he promised a commission to seek a "more definite policy" toward that country. He anticipated his budget message by saying additional outlays required an increase in appropriations of one-tenth of one per cent. He suggested a one-year income tax reduction of one per cent on normal individual and on corporation rates. "I do not favor," he said, "the operation by the Government of either power or manufacturing business except as an unavoidable by-product of some other major public purpose." He referred to his proposed nation-wide White House conferences on child-health, housing and recreation; and recommended that third-class postmasters be placed under the merit system. He advocated congressional delegation to the Executive, of power within limits and with a reserved right of revision to effect administrative reorganization.

NATIONAL STATESMEN

By James Hart

Professor, Johns Hopkins University

CALVIN COOLIDGE

For two months of 1929 Mr. Coolidge remained President. In January the Pan-American conference on conciliation adopted a significant agreement on compulsory arbitration, which the delegates of twenty nations, including those of the United States, signed. Jan. 15 the Coolidge Administration won a victory when it secured the ratification by the Senate of the Kellogg Pact by a vote of 85 to 1. The Senate adopted no reservations, but only an explanatory resolution. Jan. 28 President Coolidge sang his economy swan song before the Business Organization of the Government. Feb. 13 he signed the fifteen cruiser bill. In February, the Administration reopened the world court question, which resulted in the Root mission and the Root formula for resolving the differences growing out of the Senate's fifth reservation. March 2 Mr. Coolidge had the satisfaction of presiding in Washington at the exchange of ratifications of the Kellogg Pact. Two days later he retired to private life, to write remunerative accounts of himself.

CHARLES G. DAWES

The same fate did not come to the retiring Vice-President. In April he headed a group of experts who were invited to reorganize the finances of Santo Domingo. This new "Dawes plan" was reported April 23. The new President appointed Mr. Dawes to the Court of St. James, and his conversations with Premier MacDonald laid the basis for Anglo-American naval agreement. In a speech of June 18 the Ambassador said the limitation of naval armaments should be negotiated by statesmen, not by naval experts.

HENRY L. STIMSON

When the new Secretary of State arrived from the Philippines, he found awaiting him a dispute with Canada. An American revenue cutter had sunk the Canadian rum-runner *I'm Alone* after chasing it some two hundred miles out to sea. The captain's claim that the chase had begun 14 or 15 miles off the coast raised issues of fact, of treaty interpretation, and of international law. Canadian protests led to an agreement on arbitration. July 20 the Secretary reminded Russia and China, in connection with their dispute over the Chinese Eastern Railway, of their obligations under the Kellogg Pact. Both nations indicated their intention of abiding by the pact. In December, when hostilities again flared up in Manchuria, Secretary Stimson sent another reminder, and called on other nations to support his move. Russia retorted that this was not, in the circumstances, a friendly act. The ultimate effects of this move cannot yet be judged. In July the French parliament ratified the debt settlement; and in August a settlement of a two-year controversy with France over the "American valuation system" in our tariff was declared settled. Sept. 4 the State Department indicated it had suggested to China a gradual elimination of our extra-territorial rights in that country. In October, Turkey and the United States signed a treaty of commerce and navigation. Secretary Stimson has as yet attempted no startling moves. Whether he will be a great or merely a competent Secretary remains to be seen. He will head the American delegation to the London Naval Conference in January.

ELIHU ROOT

This elder statesman, at eighty-four years of age, performed a notable service in preparing, relative to the Senate's fifth reservation on the World Court, a "formula" which proved substantially acceptable to the Committee of Jurists, and later to the other members of the Court. In December the President had the protocol, embodying the statute of the court as amended in accordance with the Root formula, signed on behalf of the United States; and the matter will again be laid before the Senate.

DWIGHT W. MORROW

Ambassador Morrow was credited with being the prime mover in the reconciliation of Church and State in Mexico, which President Portes Gil announced in June. Mr. Morrow's genius as a negotiator and conciliator will be at the service of the Administration at the London conference in January, 1930; and thereafter he is slated to fill a vacancy as senator from New Jersey. Mr. Morrow is one of the most remarkable men now in public life.

CABINET AND COMMISSION HEADS

Andrew Mellon is no longer the leading man in the drama. Under an active President who knows what he wants, Mr. Mellon is merely a member of the Cabinet. Senator Capper, of Kansas, attracted the attention of the world when, on Feb. 11, he introduced a resolution calling for an embargo on war supplies against any violator of the Kellogg Pact. Senator Caraway, of Arkansas, came into national prominence as chairman of the senatorial committee to investigate lobbying at Washington. George W. Wickersham undertook the chairmanship of the President's commission to investigate law enforcement in general, and prohibition enforcement in particular. Alexander Legge holds an important post as chairman of the Federal Farm Board, which has already begun to make loans from its revolving fund to agricultural coöperatives.

DEMOCRATIC STATESMEN

The Democrats, who have been the Outs since 1921, lack men experienced in national affairs. Those that stand out are usually New Yorkers. The leader of the Opposition in the 1928 campaign,—Alfred E. Smith,—was sent by the voters into retirement, instead of merely being shifted to the Opposition Bench. Such is the presidential system. Franklin D. Roosevelt, Governor of New York, is still available for 1932. The year brought further into the limelight another New York Democrat, Owen D. Young. He was chairman of the committee of experts who formulated the "Young Plan" for the modification of the reparations settlement between Germany and the Allies. This was a remarkable achievement of economic statesmanship, and it makes Mr. Young the logical "business-man" opponent of Mr. Hoover in 1932.

THE PROHIBITION CONTROVERSY

By Irving Fisher

Professor, Yale University

INTRODUCTORY

The prohibition year was distinguished by the appointment by President Hoover of the National Commission on Law Observance and Enforcement, for an exhaustive study of the entire problem of the enforcement of American laws and the improvement of the judicial system. This included, in the words of the President, "the special problems and abuses growing out of the prohibition laws." Also plans were formulated looking to the reorganization of administrative forces, and an appeal was made to the Conference of Governors at Groton, Conn., July 16, 1929, by George W. Wickersham, head of the Law Enforcement Commission, to aid in bringing their states into line in a scheme of coöperation with the Federal Government, with the purpose of better enforcement. The year closed with a sharp challenge uttered by Senator Borah declaring that prohibition would "never be enforced with the present personnel from top to bottom."

PROHIBITION ADMINISTRATION

Law Enforcement Commission.—Carrying forward the program announced in his inauguration speech, President Hoover on May 20 appointed the National Commission on Law Observance and Enforcement. George W. Wickersham of New York was selected as Chairman, and with him were associated nine lawyers and one president of a woman's college, as follows: Newton D. Baker, ex-Secretary of War; Frank J. Loesch; Roscoe Pound, Dean of the Harvard Law School; William I. Grubb, Federal Judge of the Northern District of Alabama; Monte M. Lemann; William S. Kenyon, Judge; Kenneth R. Mackintosh, Judge; Paul J. McCormick, Federal District Judge for the Southern District of California; Henry W. Anderson, and Ada L. Comstock, President of Radcliffe College. All sections of the country were represented in these appointments, three of the members being Democrats and all were said to be of judicial temperament.

Plans for Prohibition Enforcement.—Oct. 1, President Hoover designated John McNab of San Francisco to make a special study of prohibition law enforcement and to formulate a plan for its betterment. Coöperating with Mr. McNab, the Department of Justice, the Treasury Department and the National Commission for Law

Observance and Enforcement were to aid in drawing up suggested changes in Federal Administration and judicial machinery. In a special message June 6, the President asked Congress for the appointment of a joint Congressional committee to study "the reorganization and concentration of responsibility and administration, of the Federal Bureaus concerned with prohibition enforcement and to submit recommendations at the December Session of Congress."

Hoover and Wickersham Statements.—In his address, May 28, at the first meeting of the National Law Enforcement Commission in Washington, President Hoover stated that the problem was not "confined to the enforcement and obedience of one law, or the laws of the Federal or State Government separately; the problem is partly the attitude toward all law." In his responsive speech Mr. Wickersham made known the purpose of the Commission to seek the cooperation of "many public and private organizations which have been studying questions bearing upon matters involved in our inquiry"; in addition, the Commission was to examine, analyze and classify the "vast accumulation of records, including statistics, reports and other material bearing upon the administration of justice, assembled in the departments of the National and State Governments."

WICKERSHAM'S APPEAL TO THE GOVERNORS

In his first utterance on prohibition as Chairman of the Law Enforcement Commission read before the Conference of Governors July 16, Mr. Wickersham said:

"The Eighteenth amendment confers upon the states concurrent jurisdiction with the National Government for the enforcement of this measure. Thus far the Federal Government alone has borne the brunt of enforcement. It seems to me that the Governors' Conference might well consider approaching the Federal Government on some feasible proposal to share this burden. If the National Government were to attempt to prevent importation, manufacture and shipment in interstate commerce of intoxicants, the states undertaking the internal police regulations to prevent sales, saloons, speakeasies, etc., national and state laws might be modified so as to become reasonably enforceable and one great source of demoralizing and pecuniarily profitable crime removed. Every state executive has sworn to support and defend the Constitution of the United States. The Eighteenth Amendment is a part of the Constitution, just as much as any other part of it. Surely it is pertinent to their Conference to suggest and consider how they may best carry out their solemn undertaking."

The Governors' Conference took no formal action on this letter. It was explained that it was contrary to the rules of the Conference to act as a body on controversial matters. The proposal was immediately debated by the drys, with leading exponents of the Eighteenth Amendment supporting and opposing it.

SENATOR BORAH'S CHALLENGE

Senator Borah's attack on the administration's enforcement of prohibition was preceded June 19 by criticism in a speech by Senator Glass to the effect that prohibition enforcement had been relegated to the background by President Hoover in the program of the Law Enforcement Commission. Senator Glass had proposed the Presidential inquiry into the problem of prohibition enforcement, which, carrying a $250,000 appropriation, had been adopted by Congress and the fund was being used for the initial work of the Law Enforcement Commission. He said:

"In an unguarded moment I allowed myself to be persuaded to insert the parenthetical words 'together with enforcement of other laws.' There was no purpose on earth in making other laws the feature; this was a mere incident to prohibition enforcement. But now what has happened? The parenthesis has been made the main thesis. Prohibition enforcement has been submerged."

In his Christmas Eve statement, Senator Borah declared that he was not deeply concerned over any report from the Law Enforcement Commission, as the trouble affecting prohibition concerned the inefficiency of officials charged with enforcement. To his demand that the personnel be reorganized from top to bottom, he added, Dec. 28: "It is necessary to state the facts, and they are going to be stated. I assert that the permit system itself, as it is being carried on, is a scandal—that it is being used in such a way as to demoralize the whole enforcement system. And I assert that the Law Enforcement Department is responsible for this. I further state that practically open saloons are running in the jurisdiction of District Attorney after District Attorney in this country. When I say this I do not mean simply New York or Chicago; I mean to state a condition which prevails throughout the country. I do not assume that you can catch every bootlegger. But the open flaunting, defiant, persistent disregard of the law day after day and month after month, with no effort being made to stop it, calls for discussion. That, in my judgment, is the best way to help the President and especially to help the enforcement of the law."

ATTORNEY-GENERAL'S REPLY TO BORAH

Attorney-General Mitchell retorted to Senator Borah's charge, Dec. 25, that "when Congress is ready to consider and adopt legislation to carry out the Administration's recommendations for more adequate law machinery, those whose duty it is to enforce the law will be able to accomplish more." He praised the work and morale of the men in his Department saying they had been working "under great handicaps" and that those of the Department connected with prohibition enforcement had been "for months past busy on measures for improving personnel, relieving congestion in the courts, reorganizing the enforcement agencies and meeting the multitude of problems arising in the effort to improve conditions."

COMMISSIONER DORAN'S STATEMENT

Prohibition Commissioner Doran stated on the same day: "Based on my twenty-two years of experience in the government service, I can affirm that on the whole we are not likely to find a more loyal and conscientious group of men than are now serving under me. In this connection, it should not be forgotten that they are now chosen from civil service lists, based on open competitive examination in accordance with the Reorganization Act recently passed by the Congress, and it is hard to believe that in the future the Congress will authorize looking elsewhere for new recruits. Moreover, such a sweeping statement overlooks the very marked progress which has been made in this particular field of law enforcement which is set forth in detail in my report to the Congress and which is amply supported by facts."

PROHIBITION ENFORCEMENT

Comparisons by Periods.—Admitting that the work of prohibition enforcement in a six-months' period of 1929 was smaller by volume than for

	April 1 to Oct. 1, 1929	April 1 to Oct. 1, 1928	Oct. 1, 1928, to Mar. 1, 1929
Distilleries seized	9,121	9,021	8,131
Stills seized	5,446	7,498	5,949
Spirits seized (wine, gallons)	705,788	600,587	569,538
Malt liquor seized	1,761,604	2,094,441	1,237,967
Autos seized	4,460	4,211	3,377
Value	$1,691,885	$1,675,306	$1,325,165
Boats and launches seized	32	51	32
Value	$614,260	$77,000	$70,330
Persons arrested by Federal officers	37,190	43,218	32,490
Arrested by State officers assisted by Federal officers	7,794	7,066	5,419
Arrested by State officers on information of Federal officers	882	1,324	730
Prosecutions in Federal courts	38,995	40,296	31,271

the corresponding period in 1928, Dr. James M. Doran, Prohibition Commissioner, said in a special report to the United States Senate, Nov. 19, that the "quality" of the 1929 work showed "marked improvement." The resolution which evoked this report, drafted by Senator Harris of Georgia, requested a comparison of prohibition work in three separate periods, as given above.

In New York.—The following figures were presented regarding the comparative periods in the New York district. (The Prohibition Unit included the full month of October, 1928, in both the first and second periods.)

	Spirits Seized Gallons	Malt Liquor Seized Gallons	Value of Autos Seized	Arrested
April 1, 1928, to October 31, 1928..	48,761	87,266	$188,685	2,876
April 1, 1929, to October 31, 1929..	41,427	62,197	78,075	755
October 1, 1928, to March 31, 1929..	70,052	113,688	144,850	1,782

The work of the Customs Bureau, detailed to seize alcoholic liquors and automobiles, was forwarded in the same communication from the Treasury Department for the months of April, May, June, July, August, September and October, 1928, and for the same period of 1929, except that the 1929 October reports were not compiled. The comparative figures follow:

District	*Gallons*	*Autos*
St. Albans, 1928	26,650	159
St. Albans, 1929	33,716	272
Ogdensburg, 1928	31,800	360
Ogdensburg, 1929	33,716	272
Buffalo, 1928	60,726	106
Buffalo, 1929	15,191	62
Tampa, 1928	69,629	41
Tampa, 1929	22,509	91
San Antonio, 1928	6,281	73
San Antonio, 1929	5,182	79
El Paso, 1928	4,662	79
El Paso, 1929	2,709	48
Nogales, 1928	280	19
Nogales, 1929	440	21
Los Angeles, 1928	2,207	59
Los Angeles, 1929	2,178	27
Seattle, 1928	2,289	38
Seattle, 1929	1,698	24
Great Falls, 1928	6,453	65
Great Falls, 1929	2,764	37
Pembina, 1928	393	10
Pembina, 1929	398	14
Duluth, 1928	516	2
Duluth, 1929	115	1
Detroit, 1928	199,594	449
Detroit, 1929	76,155	146

Less Liquor from Canada.—This same report mentioned above shows also that there has been a decreased export of beer, wine, spirits, liqueurs, and other alcoholic beverages from Canada to the United States during the year of 1929, as compared with the year of 1928, as follows:

	1928 *Gallons*	1929 *Gallons*
May	487,365	282,239
June	473,361	253,203
July	504,945	239,205
August	551,749	322,765
September	519,869	252,978

Alcohol Production and Distribution.—Dr. Doran reported, Dec. 7, that the production of alcohol by legal processes was increasing. His annual report showed that 200,832,051 proof gallons were produced in the fiscal year ending June 30, 1929, or 31,682,051 gallons more than the output of the preceding twelve months' period. During the fiscal year 8,892,247 gallons had been withdrawn from warehouses after tax payments, which represented an increase of 217,266 gallons as compared with 1928. There had also been an increase of 22,732,825 gallons withdrawn for tax-free purposes, including denaturation, for export, for use by the government, hospitals, laboratories, colleges and other educational institutions, amounting in all to 185,650,908 gallons. There had further been a slight increase in the year's total of distilled spirits, including brandy withdrawn from bonded warehouses, as compared with the preceding fiscal year.

Prosecutions.—Making the divisional report on prohibition enforcement work, Mabel Walker Willebrandt declared that there had been a "substantial increase in almost every important phase of prohibition enforcement under the National Prohibition Act, during the fiscal year 1929." There had been 56,786 criminal prosecutions instituted and 56,455 cases terminated, with 47,100 convictions, 1,477 acquittals, 4,835 cases *nolle prossed* or discontinued, and 3,043 quashed, dismissed, demurred, and so on. There had been thirty-two convictions to each acquittal. Fines, forfeitures and penalties reached $1,476,300, while collections totaled $4,200,052. There were 3,321 violators probated, an increase of 949 over the previous year. Mrs. Willebrandt said: "One of the most noticeable gains in prohibition enforcement was in the matter of padlock or injunction proceedings. There were 7,455 petitions for injunctions, which was an increase of 1,950 over the preceding year, and the number of permanent injunctions increased to 6,303 compared with 3,999 the year before, a gain of more than 57 per cent. The number of civil cases terminated during the year was 10,961, compared with 8,517 the year before. Notwithstanding this, however, there was an increase of 276 cases pending. The aggregate amount of judgments in favor of the United States was $465,480 as against $382,853 the preceding year."

LIQUOR SMUGGLING

The report of the Attorney-General for the fiscal year 1929 states: "The seizures of foreign liquor-running vessels this year were fewer in number than those occurring during the preceding year and about half as many as those occurring in the year 1925." It adds that the larger vessels are gradually abandoning the trade, and that a greater proportion of the captured foreign vessels are made up of motor boats. No report is made on domestic vessels seized while engaged in smuggling liquors. With respect to the increasing volume of contraband liquors smuggled across the international boundary from Canada, the Attorney-General states: "Most of the difficulty arises in the waterways of the Great Lakes System. Special effort is now being made to coördinate more effectively the preventive forces of the United States. It is hoped that very substantial progress may be reported in the next annual report that we give out."

PROHIBITION IN THE DISTRICT OF COLUMBIA

The Gibson Subcommittee of the House Committee on the District of Columbia reported to Congress in February that "three thousand bootleggers are plying their trade daily in the capital city." To a statement by Senator Howell that the prohibition law was not being enforced in the District, President Hoover, Sept. 22, called upon the Senator for "definite facts" to support his assertion that the President could make Washington dry if he insisted on it. Senator Brookhart in a speech Sept. 24 told of the serving of liquor to newly elected and old Senators at the New Willard Hotel some years previously. On that day Senator Howell again repeated what he again declared to be "common knowledge in this city, and from what is the belief outside of Washington with respect to Washington, the repository of our Constitution and the Seal of our Government."

In his annual message December 4, President Hoover said: "The District of Columbia should be the model of city law enforcement in the nation. While conditions here are much better than in many cities, they are far from perfect, and this is due, in part, to the congestion of criminal cases in the Supreme Court of the District, resulting in long delays. Furthermore, there is need for legislation in the District supplementing the National Prohibition Act, more sharply defining and enlarging the duties and powers of the District Commissioners and the police of the District, and opening the way for better coöperation in the enforcement of prohibition between the District officials and the prohibition officers of the Federal Government. It is urgent that these conditions be remedied."

PROHIBITION KILLINGS

A statement issued by the Treasury Department, April 5, revealed that 25 persons had been killed during the preceding fifteen months, of whom 16 met their deaths in encounters with Federal Prohibition agents and Coast Guardsmen, and nine were in the Government's enforcement service. Seven of these were Prohibition agents, while two were mounted Customs officers. Since 1920, when the Eighteenth Amendment became effective, it was stated that 190 persons had been killed in enforcement of the prohibition laws; of these, 135 were killed by prohibition agents, while 55 were prohibition agents who met death in the line of duty. At the same time the White House announced that during several months stringent orders had been in force, during which the Federal Statutes prohibiting invasion and search of dwellings and vehicles, unless the searching officials were armed with warrants, issued on sworn statements of knowledge or belief that the prohibition laws had been violated, had been strictly observed. Seymour Lowman, Assistant Secretary of the Treasury, stated that for more than a year the promiscuous use of firearms had been forbidden and there had been a material decrease in violent deaths incident to prohibition enforcement.

APPROPRIATIONS

Appropriations for enforcement of the prohibition law were provided in the first and second Deficiency Supply Bills passed by the United States Senate March 2, 1929, carrying an increase of $3,227,014 for all prohibition activities. This sum was added to the $28,000,000 previously voted by Congress to enforce prohibition; of this $13,000,000 was devoted to the Prohibition Bureau in the fiscal year beginning July 1, 1929, and something over $15,000,000 to the Coast Guard for enforcement of the prohibition and narcotic laws. The additional appropriation included $250,000 allotted for the projected Hoover Law Enforcement investigation, and $200,000 additional for narcotic law enforcement. Immediate expansion of the Prohibition Bureau's field forces was provided by the inclusion of $1,710,654, in one of the bills and $707,860 in the other bill to provide sixteen new Assistant United States Attorneys in as many districts. Besides, $200,000 was devoted to increase the personnel of the Civil Service Commission in order to speed up the certification of dry agents, and $150,000 for doubling the rum-smuggling patrol of the Customs Bureau along the Canadian border.

LEGISLATION

The Jones Act.—By a vote of 283 to 90, the House of Representatives passed, Feb. 28, the Jones Bill unchanged from the form in which it passed the Senate, punishing first offenses against the prohibition law by a fine of $10,000 or five years' imprisonment, or both, in the discretion of the courts. With respect to this bill, George W. Wickersham, prior to his appointment as the head of the Law Enforcement Commission, commented May 7, in an address at Williamsburg, Va.: "The policy of the Jones Act which seeks to compel observance of the Prohibition law by more rigorous penalties probably will defeat itself through the consequences which it entails in requiring prosecution by indictment and not by information and trial by jury in every case. This will mean one of two things—either a very large increase in the number of Federal Judges or the continual embarrassment of civil litigants in the delays caused by the swelling tide of criminal indictments and trials under the Prohibition Act." The bill left it within the discretion of the court not to apply its penalties to slight violations of the law.

The Sheppard Bill.—The Sheppard Bill (S1827) would extend the scope of the Eighteenth Amendment by making the purchase of intoxicating liquor a crime against the United States. This bill, which was not made law during 1929, stirred opposition on the ground, as declared by Senator Hawes, that it would "put another army of millions of men and women into the lawless class." In introducing his bill Oct. 7, Senator Sheppard of Texas, co-author of the National Prohibition Act, said:

"In my recent address in the Senate, giving the history of the development and adoption of the Eighteenth Amendment, I stated that a court had decided that the purchase of intoxicating liquor for beverage purposes was punishable under the Volstead Act if made in connection with an act of transportation. Since that time a higher court has reversed this holding and progress in the direction of prohibition of purchase has been halted, at least to the extent of this last decision. This, and the fact of the continued advance of prohibition sentiment and achievement make it advisable, in my opinion, definitely to prohibit purchase by the terms of the Volstead Law."

ELECTIONS OF 1929

By Thomas N. Hoover

Professor, Ohio University

The elections of 1929 were decidedly *by* affairs. The air was scarcely rippled by the many voices of the many candidates, as was the condition in 1928. However, there were a few elections which held some interest.

GOVERNOR

In the state of Virginia interest was keen because of the Hoover victory in that state in 1928. The regular Democratic candidate was John Garland Pollard. The Republican and Hoover Democratic candidate was William Mosely Brown. The result was the election of Governor Pollard, by a lead of 70,000 votes. There are many conclusions drawn by as many people from this result. It would seem to mean that the voters in 1928 voted for Herbert Hoover, rather than against Alfred E. Smith.

HOUSE OF REPRESENTATIVES

There was but one member of the lower house elected in November of 1929, to fill a vacancy in the 21st district in New York State. Joseph A. Gavagan, Democrat, was elected.

UNITED STATES SENATORS

Ohio.—There were no Senators voted for at the November election. Several changes since the election have taken place. These events are of special significance due to the political complexion of that body. In Ohio, a vacancy was caused by the death of Senator Frank B. Willis, when he was in the midst of his campaign for the presidential nomination in 1928. The then governor,—Vic Donahey, Democrat,—appointed Cyrus H. Locker, Democrat, to fill the vacancy till after the 1928 election. Former Senator and Representative Theodore Burton was nominated by the Republicans, and was elected to fill the remainder of the Willis term, in November, 1928. Ex-Senator Locker soon afterward died, and Senator Burton died in November, 1929. Governor Cooper, Republican, appointed former Representative Roscoe Conkling McCulloch, Republican, to fill the vacancy. This appointment will hold till the next election, when Senator McCulloch, or some other candidate will be elected to complete the remainder of the Willis term.

New Jersey.—In New Jersey a vacancy was caused by the appointment of Senator Walter E. Edge as Ambassador to France. Governor Larson, Republican, appointed David Baird, Jr., Republican to fill the vacancy temporarily. He is to be followed by Dwight W. Morrow, Republican, who has rendered conspicuous service as Minister to Mexico.

Pennsylvania.—The United States Senate has at last ended the Vare-Wilson contest of the 1926 vintage from Pennsylvania, by denying to both Vare and Wilson the seat in the senate, and declaring that a vacancy exists. Governor Fisher, Republican, has filled the vacancy, temporarily, by the appointment of Joseph R. Grundy to the position.

Wyoming.—The death of Senator Francis E. Warren, Republican, the last Civil War veteran of the Union Army to serve in the Senate, made a vacancy from the State of Wyoming. The successor to the late Senator Warren is Patrick J. Sullivan, Republican, a native of Ireland. Senator Warren had served in the Senate for 36 years.

CONSTITUTIONAL AMENDMENT

A very important amendment to the Constitution of Ohio was submitted to the voters and adopted by a majority of 200,000 votes. This amendment will become effective in 1931, when the old uniform rule of taxation will be cast into the discard. Under the provisions of the amendment all property taxed according to value, shall be taxed not to exceed 1½% of its value. Real estate must be taxed at a uniform rule according to its value in money, therefore it must be limited to the 1½% rate, unless the people of a district vote upon themselves a higher rate. All other property may be classified for taxation purposes.

MAYORS

Mayor James J. Walker, Democrat, was overwhelmingly reëlected to another four year term in New York City over Major Fiorello La Guardia, the Republican opponent, and Norman Thomas, Socialist, who received 175,000 votes. Mayor William B. Harrison, Republican of Louisville, Kentucky, won over his Democratic rival, Edward M. Reidling, by more than 20,000. Reginald Sullivan, Democrat, was elected Mayor of Indianapolis, over his Republican opponent, Alfred M. Glossbenner. Mayor Charles H. Kline, Republican, was reëlected as Mayor of Pittsburgh, over Thomas A. Dunn, Democrat.

COGNATE SOCIETIES

GENERAL

American Antiquarian Society, Worcester, Mass.
American Baptist Historical Society, Upland Ave., Chester, Pa.
American Irish Historical Society, 132 E. 16th St., New York, N. Y.
American Historical Association, 40 B St., S. W., Washington, D. C.
American Jewish Historical Society, 531 W. 123rd St., New York, N. Y.
American Numismatic Society, 156th St. at Broadway, New York, N. Y.
American Proportional Representation League, 1417 Locust St., Philadelphia, Pa.
American Scenic and Historic Preservation Society, 154 Nassau St., N. Y. C.
American Society of Church History, 98 Mercer St., Princeton, N. J.
Canadian Historical Association, Ottawa, Ontario, Can.
Hispanic Society of America, 156th St. W. of Broadway, New York, N. Y.
Holland Society of New York, 90 West St., New York, N. Y.
Huguenot Historical Society of America, 2 West 45th St., New York, N. Y.
Lincoln History Society, 30 Irving Place, New York, N. Y.
Methodist Historical Society, 150 Fifth Ave., New York, N. Y.
Mississippi Valley Historical Association, Austin, Texas.
National Historical Society, 33 W. 97th St., New York, N. Y.
New England Historic Genealogical Society, 9 Ashburton Place, Boston, Mass.
Northwestern Association of History, Government and Economic Teachers, Spokane, Washington.
Presbyterian Historical Society, 520 Witherspoon Bldg., Philadelphia, Pa.
Society for the Preservation of New England Antiquities, 2 Synde St., Boston, Mass.
Steuben Society of America, 369 Lexington Ave., New York, N. Y.
Thomas Paine National Historical Assn., 50 West 47th Street, New York, N. Y.
United States Catholic Historical Society, New York, N. Y.
Woodrow Wilson Foundation, 17 East 42nd Street, New York, N. Y.

POLITICAL

League for Independent Political Action, 52 Vanderbilt Ave., New York, N. Y.
League for Industrial Democracy, 70 Fifth Ave., New York City.
National Democratic Committee.

National Municipal League, 261 Broadway, New York, N. Y.
National Republican Committee.
National League of Women Voters, 532 17th St., N. W., Washington, D. C.
Women's National Democratic Club, Inc., Hotel Wellington, 235 W. 102nd St., N. Y. C.
Women's National Republican Club, 6 E. 37th Street, New York, N. Y.

DIVISION II

INTERNATIONAL SITUATIONS AFFECTING THE UNITED STATES

THE UNITED STATES FOREIGN SERVICE

BY MARGARET DEFOREST HICKS WILLIAMS

WRITER AND SPECIALIST ON INTERNATIONAL AFFAIRS

ROGERS BILL REORGANIZATION

Services Merged.—A momentous and far-reaching change occurred in the status of the diplomatic and consular services of the United States when, on July 1, 1924, the so-called Rogers Bill became a law. By this Act, which was approved on May 24, 1924, the former diplomatic and consular services were merged into one, to be known thenceforth as the United States Foreign Service. Prior to 1906, both the diplomatic and consular services were administered on a political basis. In that year the consular service was placed on a civil service basis, and three years later (1909) a similar status was accorded the diplomatic service also. There were, however, manifest improvements needed even after these two changes had been brought about, and it was to effect these improvements that the Rogers Bill was drafted and made a law.

Purposes and Provisions. — The most obvious weaknesses of the former dual system centered about salaries, promotions, non-interchangeability of position between the two services, and the lack of adequate retirement provisions. The principal sections of the Rogers Bill (Public—No. 135—68th Congress; H. R. 6357) deals with these problems most effectively. By virtue of its provisions: (a) sufficiently adequate salaries are provided to make it possible for men not possessing independent means to enter the service; (b) sufficient reward for meritorious service is offered to attract and hold able men by placing within the reach of all who show adequate ability the attainment of the grade of minister and ambassador; (c) foreign service officers may be assigned either to consular or diplomatic posts interchangeably; (d) a retirement and pension system is inaugurated.

Analysis of Change.—Provision is made that "hereafter the Diplomatic and Consular Services of the United States shall be known as the Foreign Service of the United States." The term "Foreign Service Officer" shall be the designation of every member of the Foreign Service below the rank of minister, "all of whom are subject to promotion on merit and who may be assigned to duty in either the diplomatic or the consular branch of the Foreign Service at the discretion of the President." The former diplomatic and consular classes are abolished, and provision is made for nine new classes with salaries ranging from $9,000 in Class One, downward to $3,000 in Class Nine; and with unclassified subordinate grades from $3,000 downward.

Appointments to the position of Foreign Service officer shall be made only after examination and a suitable period of probation in an unclassified grade; or, after five years in continuous service in the Department of State, by transfer therefrom under such rules and regulations as the President may prescribe. From time to time the Secretary of State shall report to the President the names of Foreign Service officers showing special ability, or showing merit for promotion to the grade of minister; and the names of persons found, upon taking the prescribed examinations, to have fitness for appointment to the service. Reclassification of the former diplomatic and consular officers has provided the new grades, one to nine, respectively, prescribed under the new law.

Duties and Powers.—All Foreign Service officers must deposit a bond with the Treasury of the United States. Foreign Service officers inspecting either consular or diplomatic offices shall have the same duties, powers, and prerogatives formerly accorded the Consuls General at large under the old system.

Salaries and Allowances.—A very important provision, in view of the fact that the Act does not raise the salaries of ambassadors ($17,500) or ministers ($12,000 and $10,000), is that the President may grant them "representation allowances out of any money which may be appropriated for such purposes from time to time by Congress." Any Foreign Service officer may be assigned to the Department of State for a limited period without loss of class or salary. At the discretion of the Secretary of State, a Foreign Service officer may be ordered to the United States on statutory leave of absence.

Service Grades and Retirement.—Foreign Service officers may be appointed to serve as Counselors of Embassy or Legation, commissioners, chargé d'affaires, ministers resident, or diplomatic agents without loss of grade, class, or salary with, in certain cases, additional compensation. Foreign Service officers may be retired upon reaching the age of 65 years, annual pensions may be paid from an annuity fund secured by a yearly deduction of 5 per cent. from salaries, and a commensurate yearly contribution to the fund by the Government. Retired Foreign Service officers may be recalled to active service in the event of public emergency.

Assistant Secretaries of State.—The titles Second Assistant Secretary of State and Third Assistant Secretary of State shall hereafter be known as Assistant Secretary of State, without numerical distinction of rank. An additional Assistant Secretary of State replaces the former position of Director of the Consular Service.

ADMINISTRATIVE BOARDS AND COMMITTEES

Regulations.—Of equal importance with the Rogers Act are the Administrative Regulations embodied in an Executive Order No. 4022, June 7, 1924. These regulations give practical effect to all the chief purposes of the Act. They set up the machinery whereby it is put into operation by providing for a Foreign Service Personnel Board, an Executive Committee, a Board of Examiners, a Foreign Service School, and a Foreign Service School Board.

Foreign Service Personnel Board.—The duties of this board are to examine into the character, ability, efficiency, experience and general availability of all members of the Service with a view to promotion, transfers, the consideration of controversies or delinquencies, and the recommendation of those showing marked general ability to the rank of minister, as vacancies arise. The board is composed of the Under Secretary of State, who is chairman; an Assistant Secretary of State, the Assistant Secretary of State formerly known as the Director of the Consular Service, and members of the Executive Committee of the Foreign Service Personnel Board.

The Executive Committee.—The duties of the Executive Committee of the Foreign Service Personnel Board are left to the discretion of the Secretary of State and are prescribed by him. The board is composed of a chairman and two other members who are Foreign Service officers of high rank representing both the diplomatic and consular branches of the Foreign Service. These three are selected by the other members of the Personnel Board with the approval of the Secretary of State.

The Board of Examiners.—The duties of this Board are to formulate rules for and hold examinations of applicants for commission to the Foreign Service and to determine those who are fitted for appointment, and the scope and method of examination which shall be both oral and written and open only to American citizens of good standing between the ages of 22 and 35 and designated by the President for appointment subject to examination. The Board is composed of the Under Secretary of State, an Assistant Secretary of State to be designated by the Secretary of State, the Assistant Secretary of State formerly known as the Director of the Consular Service, the Chairman of the Executive Committee of the Foreign Service Personnel Board, and the Chief Examiner of the Civil Service Commission or such persons as may be designated by him to serve in his stead.

THE FOREIGN SERVICE SCHOOL

Purposes.—The purpose of this school is to provide a one year term of instruction in the Department of State as a period of probation for those successfully passing the examinations given by the Board of Examiners, and to adjudge, during this period, the new appointees to the Service, as to their qualifications for advancement and assignment to duty as a Foreign Service officer. The governance of the school is to be set forth in rules and regulations prescribed by the Secretary of State. The school is under the direction of the Foreign Service School Board.

The Foreign Service School Board.—The duties of the Board are to act in all matters concerning the functions of the school with the approval of the Secretary of State; to select the chief instructor of the Foreign Service School from among the officers of the Foreign Service with the approval of the Secretary of State; and in its discretion, to select other instructors from among the qualified officers of the Department of State, the Foreign Service, the executive departments of the Government, and other available sources. The Board is composed of the Under Secretary of State, an Assistant Secretary of State to be designated by the Secretary of State, the Assistant Secretary of State formerly known as the Director of the Consular Service, the Chairman of the Executive Committee of the Foreign Service Personnel Board, and the chief instructors of the Foreign Service School.

FOREIGN SERVICE PERSONNEL

Changes.—During 1929 ninety-nine persons took the written examinations for appointment to the United States Foreign Service. Seventy-one passed the written test and presented themselves for the oral. Thirty passed the oral test as well. Of this thirty, twenty-seven were appointed to the Foreign Service. Six women took the examinations. None of the women that took it passed.

Promotion from Ranks.—Since 1925 when the policy was formulated of promoting outstanding officers of the Service to the grade of minister and ambassador instead of recruiting them from civil life, there have been marked advances. During the year 1929, thirty-five ministers and thirteen ambassadors representing the United States in foreign countries have been appointed from the ranks of the Foreign Service instead of being recruited from civil life.

Losses to Service.—During 1929 there have been five deaths, four retirements, and forty resignations from the Foreign Service. The number of retirements is unusually high. In 1928 there were only thirteen resignations. In most cases the cause of resignation was the small salaries which still, even with the passage of the Rogers Act, attach to the positions of the Service. It continues to be a practical impossibility for a man to occupy any of the higher ranks in the Service and maintain his position on his salary alone, a deplorable fact which obviously needs to be remedied by Congressional action. A minister of high rank is obliged to have a private income.

RECLASSIFICATION

The practical results of the putting into effect of the provisions of the Rogers Act and Executive Order No. 4022 may be seen from the following table which shows the reclassification from the old to the new status with salaries:

Former Classifications	Former Salary	New Classification as Foreign Service Officer	New Salary	No. in Grade as of Dec. 1, 1929
Secretary, Class One (Counselor of Emb.)	$ 4,000	Class One	$9,000	23
Consul General, Class One	12,000*	Class One	9,000	
Consul General, Class Two	8,000	Class One	9,000	
Secretary, Class One (Counselor of Leg.)	4,000	Class Two	8,000	24
Consul General, Class Three	6,000	Class Two	8,000	
Secretary, Class One	4,000	Class Three	7,000	48
Consul General, Class Four	5,500	Class Three	7,000	
Consul General at Large	5,000	....	5,000	
Secretary, Class Two	3,600	Class Four	6,000	57
Consul General, Class Five	4,500	Class Four	6,000	
Consul, Class One	8,000*	Class Four	6,000	
Consul, Class Two	6,000	Class Four	6,000	
Consul, Class Three	5,000	Class Four	6,000	
Chinese Secretary	5,500	Class Four	6,000	
Japanese Secretary	5,500	Class Four	6,000	
Turkish Secretary	5,500	Class Four	6,000	
Consul, Class Four	4,500	Class Five	5,000	61
Secretary, Class Three	3,000	Class Six	4,500	81
Consul, Class Five	4,000	Class Six	4,500	
Chinese Asst. Secretary	4,000	Class Six	4,500	
Japanese Asst. Secretary	4,000	Class Six	4,500	
Turkish Asst. Secretary	4,000	Class Six	4,500	
Consul, Class Six	3,500	Class Seven	4,000	90
Secretary, Class Four	2,500	Class Eight	3,500	87
Consul, Class Seven	3,000	Class Eight	3,500	
Consul, Class Eight	2,500	Unclassified	3,000	50
Consul, Class Nine	2,000	Unclassified	3,000	
Vice-Consul of Career	2,500	Unclassified	2,750	53
	2,750	Unclassified	2,750	
Consular Assistants	1,500	Unclassified	2,500	108
	2,500	Unclassified	2,500	
Interpreters	2,000	Unclassified	2,500	
Student Interpreters	1,500	Unclassified	2,500	

* Sect. 8 of the Rogers Act provides "that Consuls General of Class One, and Consuls of Class One, holding office at the time this Act takes effect shall not, as a result of their recommissioning or reclassification suffer a reduction in salary below that which they were then receiving: Provided however, that this provision shall apply only to the incumbents of office mentioned at the time this Act became effective."

DIPLOMATIC PERSONNEL

AMBASSADORS

ACCREDITED BY UNITED STATES — ACCREDITED TO UNITED STATES

Country		Appointed		Commissioned
Argentina	Robert Woods Bliss	1927	Senor Don Julian Enciso (Chargé d'Affaires A.I.)	1929
Belgium	Hugh S. Gibson	1927	H.H. Prince Albert de Ligne	1927
Brazil	Edwin V. Morgan	1912	Mr. S. Gurgél do Amaral	1925
Chile	Wm. S. Culbertson	1928	Senor Don Carlos G. Dávila	1927
Cuba	Charles B. Curtis (Counselor of Emb.)	1927	Senor Don Orestes Ferrara	1926
France	Walter E. Edge	1929	M. Paul Claudel	1927
Germany	Jacob Gould Schurman	1925	Herr Friedrich W. von Prittwitz	1928
Great Britain	Charles G. Dawes	1929	The Rt. Hon. Sir Esme Howard	1924
Italy	John W. Garrett	1929	Nobile Giacomo de Martino	1925
Japan	Charles MacVeagh	1925	Mr. Katsuji Debuchi	1928
Mexico	Dwight W. Morrow	1927	Senor Don Manuel C. Téllez	1925
Peru	Alexander P. Moore	1928	Dr. Hernán Velarde	1924
Russia	....		Mr. Serge Ughet, Financial Attaché, New York	
Spain	Ogden H. Hammond	1925	Senor Don Alejandro Padilla y Bell	1926
Turkey	Joseph C. Grew	1927	Ahmed Mouhtar Bey	1927
Union of Soviet Socialist Republics	No Diplomatic Relations		No Diplomatic Relations	

MINISTERS

	ACCREDITED BY UNITED STATES		ACCREDITED TO UNITED STATES	
Country		Appointed		Commissioned
Albania	Charles C. Hart	1925	Mr. Faïk Konitza	1926
Austria	Albert Henry Washburn	1922	Mr. Edgar L. G. Prochnik	1925
Bolivia	David E. Kaufman	1928	Senor Dr. Don Ricardo Jaimes Freyre	1923
Bulgaria	H. F. Arthur Schoenfeld	1928	Mr. Simeon Radeff	1925
Canada	William Phillips	1927	The Hon. Vincent Massey	1927
China	John Van A. MacMurray	1925	Mr. Chao-Chu Wu	1929
Colombia	Jefferson Caffery	1928	Dr. Enrique Olaya	1922
Costa Rica	Roy T. Davis	1922	Senor Don J. Rafael Oreamuno	1922
Czechoslovakia	Lewis Einstein	1921	Mr. Zdeněk Fierlinger	1925
Danzig, Free City of	C. Warwick Perkins, Jr. (Vice-Consul, in charge)	1929	....	
Denmark	H. Percival Dodge	1926	Mr. Constantin Brun	1912
Dominican Republic	Evan E. Young	1925	Senor Angel Morales	1926
Ecuador	Gerhard E. Bading	1922	Senor Don Juan Barberis (Chargé d'Affaires A.I.)	1925
Egypt	Franklin Mott Gunther	1928	Mahmoud Samy Pasha	1925
El Salvador	Warren D. Robbins	1928	Senor Dr. Don Francisco A. Lima	1927
Estonia	Frederick W. B. Coleman	1922	Col. Victor Mutt (Con. Gen. in New York in charge of Leg.)	1927
Ethiopia	A. E. Southard	1927	....	
Finland	Alfred J. Pearson	1925	Mr. Axel Leonard Aström	1922
Greece	Robert P. Skinner	1926	Mr. Charalambos Simopoulos	1924
Guatemala	Arthur H. Giessler	1922	Senor Don Julio Montano Novella (Chargé d'Affaires A.I.)	1927
Haiti	Stuart E. Grummon (3rd Sec. of Leg. in charge)	1928	Mr. Hannibal Price	1925
Honduras	George R. Merrell, Jr. (2nd Sec. of Leg. in charge)	1928	Senor Dr. Don Ernesto Argueta	1929
Hungary	J. Butler Wright	1927	Count Lászlo Széchényi	1922
Iraq	John P. Hurley (Consul in charge)		....	
Irish Free State	Frederick A. Sterling	1927	Mr. Michael MacWhite	1929
Latvia	Frederick W. B. Coleman	1922	Mr. Arthur B. Lule (Con. General, N. Y.)	1927
Liberia	Clifton R. Wharton (3rd Sec. of Leg. in charge)	1925	....	
Lithuania	Frederick W. B. Coleman	1922	Mr. Kazys Bizauskas	1924
Luxemburg	Hugh S. Gibson	1927	Baron Raymond de Waha (Chargé d'Affaires)	1920
Monaco	Robertson Honey, Consul	1929	....	
Morocco	Maxwell Blake (Diplomatic Agent)	1927	....	
Netherlands	Gerrit John Diekema	1929	Mr. J. H. van Royen	1927
Nicaragua	Charles C. Eberhardt	1925	Senor Dr. Don Juan B. Sacasa	1929
Norway	Laurits S. Swenson	1921	Mr. Alexis H. G. O. Lundh (Chargé d'Affaire)	1926
Palestine	Paul Knabenshue (Con. Gen.)	1928	....	
Panama	Benjamin Muse (2nd Sec. of Leg. in charge)	1928	Senor Dr. Don Ricardo J. Alfaro	1922
Paraguay	George L. Kreeck	1925	Senor Don Pablo M. Ynsfran (Sec. of Leg. in charge)	1929
Persia	Hoffman Philip	1925	Mirza Davour Khan Meftah	1926
Poland	John B. Stetson, Jr.	1925	Mr. Tytus Filipowicz	1929
Portugal	Fred Morris Dearing	1922	Viscount d'Alte	1902
Rumania	Charles S. Wilson	1928	Mr. Charles A. Davila	1929
San Marino	Joseph E. Haven (Consul)	1925	....	
Serbs, Croates, and Slovenes, Kingdom of	John Dyneley Prince	1926	Dr. Leonide Pitamic	1929
Siam	Harold Orville Mackenzie	1927	Maj. Gen. Prince Amoradat Kridakaral	1929
Sweden	Leland Harrison	1927	Mr. W. Boström	1926
Switzerland	Hugh R. Wilson	1927	Mr. Marc Peter	1920
Syria	George L. Brandt, Consul	1928	....	
Uruguay	U. Grant-Smith	1925	Dr. J. Varela	1920
Venezuela	George T. Summerlin	1929	Senor Dr. Don Carlos F. Grisanti	1926

TREATIES COMPLETED AND RATIFIED

By Denys P. Myers

Director of Research, World Peace Foundation

GENERAL

Out of 37 treaties ratified and entering into force between the United States and other countries from January 1 to October 31, 1929, all except ten dealt with the pacific settlement of international disputes. Of that number 15 were bilateral arbitration treaties, 11 of conciliation and one the multilateral treaty for renunciation of war as an instrument of national policy. The latter on December 20 numbered 56 ratifications or adhesions and had the same binding effect upon the parties to it that 1,540 bilateral treaties would have.

KELLOGG PACT

The general treaty for renunciation of war signed at Paris on August 27, 1928, entered into force at a formal ceremony in Washington on July 24, 1929. At that time it came to bind 46 states, without limit of time, the most wide-reaching important act of state in the history of treaties. The part which Mr. Kellogg had played in negotiating the treaty as Secretary of State and in bringing about its acceptance gave it a peculiarly American tang and insured its becoming a particular feature of United States foreign policy. Parties to the treaty, which number 56 on December 20 and are destined to number 62—the whole treaty making world, less two—"condemn recourse to war," they "renounce it as an instrument of their national policy" and agree never to seek the settlement of their disputes "except by pacific means." In the opinion of the Washington Government, the first two engagements express its desires and the mechanism for realizing the third is at hand in the arbitration and conciliation treaties, so far as they exist.

WORLD COURT

The signing of the documents concerning the Permanent Court of International Justice on behalf of the President in 1929 commits the United States to a further step in pacific settlement familiar to the rest of the world, the judicial method. The United States has not expressed itself upon the "optional clause," under which contracting states may be hailed before the court for what may be called strictly legal categories of cases without their consent in the instant dispute. That formula for defining the strictly legal categories, however, is the basis of the definition of arbitral disputes in the Pan American treaty of arbitrations, signed on January 5, 1929, but not ratified within the year.

MULTILATERAL TREATIES

General.—For many years the United States avoided multilateral treaties. That this distaste is passing in favor of the efficiency of mass production is shown by the fact that seven such treaties entered into force respecting it in 1929 and the first day of 1930. Several more were signed in the course of the year, including a new convention on safety of life at sea and a revision of the air navigation convention, expected to meet the objections which have kept the country from participating under the 1919 document. One of the conventions coming into force was the radiotelegraphic of 1927, resulting from a conference at Washington and for which the Department of State acts as depository of the ratifications of 79 governments and colonial territories. An interesting multilateral arrangement was effected by exchange of notes between the United States, Canada, Cuba and Newfoundland relative to the assignment of high frequencies to radio stations on the North American Continent, signed Feb. 26 and 28. Three others have a special interest in that they represent the initial recognition by the United States of the League of Nations as an appropriate mechanism for the making of treaties and supervising their execution. Each of these has a distinct importance for American interests.

The slavery convention signed at Geneva, Sept. 25, 1926, was the result of the discovery by the Permanent Mandates Commission that the ownership of human beings existed in various forms in Africa and elsewhere. A thorough investigation of the facts preceded the conclusion of the convention by the Seventh Assembly of the League of Nations. The document was submitted to the United States with a view to its adherence, and it laid before the Senate a long time. Feb. 25, 1929, it advised adherence with a reservation disapproving the continued admission of compulsory or forced labor. The document commits the United States to nothing that it did not previously accept, but becoming a party to it places the country behind the repressive movement throughout the world.

Liquor Traffic.—The convention relating to the liquor traffic in Africa signed at St. Germain-en-Laye Sept. 10, 1919, in effect modified the convention of 1899, to which the United States was a party. The new one had been pending before the Senate for several years, apparently because the Central International Office provided for in it was placed under the control of the League of Nations. The Senate advised its ratification Feb. 28, 1929, with a reservation referring disputes to the Permanent Court of Arbitration instead of the Permanent Court of International Justice exclusively, so far as the United States is concerned.

International Trade.—The convention which comes into force Jan. 1, 1930, is that on import and export prohibitions and restrictions, which has the effect of abolishing literally hundreds of impediments to international trade. It was entirely a League of Nations product, the machinery of the institution having explored the subject thoroughly before a draft was made and submitted to a diplomatic conference after review by the governments. The United States participated officially in the conference of Nov., 1927, which drew up the convention and again in a second conference to arrange for its coming into force and to arrive at the net exceptions to the general principle maintained by the contracting parties. So delicate was the subject that the convention's entrance into force was conditioned upon the ratifications of 18 states, which were to be in hand by Sept. 30, 1929. The other countries did not wish to intrust the fate of their handiwork to the action of the Senate and so allowed the United States more time. To their satisfaction, the Senate advised ratification of the convention Sept. 14 and it was consequently in no wise due to the United States that the program was not carried out. The hitch was due to a lack of the requisite number of ratifications unconditioned upon those of other states. A fresh conference in December arranged for the convention to come into force for 17 ratifying parties, including the United States.

BILATERAL TREATIES

Tariff Relation with China.—The most important bilateral treaty coming into force during 1929 was that regulating tariff relations with China, signed on July 25, 1928, and in force from Feb. 20. China is recovering tariff autonomy with or without foreign consent. In fact, it put a national tariff into effect Feb. 1, 1929, and foreign states had the choice of trying to impose old treaties, accept the schedule or grant China the autonomy that it was assuming. The discretion of justice pointed to the latter alternative, and the United States treaty was the first of a series annulling old engagements and applying the principle of complete national tariff autonomy, subject to the avoidance of discriminatory treatment.

Canada.—Arrangement by exchange of notes with Canada, governing radio communications between private experimental stations, signed Oct. 2 and Dec. 29, 1928, and also signed Jan. 12, 1929.

Greece.—Convention with Greece on the prevention of smuggling of intoxicating liquors, signed April 25, 1928; in force Feb. 18.

Poland.—Treaty and protocol on extradition with Poland, signed Nov. 22, 1927; in force June 6.

Mexico.—Conventions with Mexico extending duration of the general and special claims commissions, signed Sept. 2 and Aug. 17, respectively; in force Oct. 10 and 29, respectively.

TREATY ORGANIZATION IN DEPARTMENT OF STATE

The most interesting treaty development in the United States was not, however, the documents that were made into law, far-reaching as they were in 1929. It was the clear evidence that the Department of State is attending to treaty business with the care that it demands. In the long run a great country determines its whole relationship with its peers through the formal agreements that are given stable form as treaties. Foreign relations depend for their conduct in a sure manner to a large degree upon constant and accurate information respecting the status of treaty engagements. The establishment of a Treaty Division in the Department of State in April, 1928, was a recognition of this condition. That division in 1929 began to show the results of consolidating all treaty negotiations, information and management into a single office as a separate division.

Beginning with March, 1929, there began the issuance of the *Monthly Bulletin of Treaty Information,* originally in multigraph and since October in print.[1] The extraordinary amount of valuable information included in the *Bulletin* was doubtless as much of a surprise to the officials as to the public. It announces the initiation and completion of negotiations, all changes of status in treaties concerning the United States, their progress through ratifying processes, their entrance into force, appointments under them, documents subsidiary to them, in fact, everything relating to the treaty structure of the United States, except a calendar of Senate action with a view to advice and consent.

THE UNITED STATES AND WORLD AFFAIRS

By J. M. Mathews

Professor, University of Illinois

THE KELLOGG PEACE TREATY

Senate Committee Report.—By a vote of eighty-five to one the Senate in January, 1929, gave its approval to the treaty for the renunciation of war, commonly known as the Kellogg Pact. This action followed presentation to the Senate of a report from its Committee on Foreign Relations expressing the Committee's understanding as to the meaning of the treaty with respect to American obligations under the Monroe Doctrine, etc. The report thus presented to the Senate was not acted upon by that body and was not intended to modify the treaty nor to constitute a reservation to it.

President Hoover's Comment.—In July the Kellogg Pact was proclaimed to be in force. On this occasion, President Hoover made this significant statement: "I dare predict that the influence of the treaty for the renunciation of war will be felt in a large proportion of all future international acts. The magnificent opportunity and the compelling duty now open to us should spur us on to the fulfilment of every opportunity that is calculated to implement this treaty and to extend the policy which it so nobly sets forth."

Obligations under the Pact.—President Hoover, in his desire to "implement the treaty" is hardly in harmony with the views of the Senate committee, which, as indicated by its report, seems to be of the opinion that the treaty places us under no obligation to interfere in the wars of other nations. In a joint statement issued by President Hoover and Prime Minister

---

[1] Subscription to Superintendent of Documents, Government Printing Office.

MacDonald of Great Britain in October, it was declared that "both our governments resolve to accept the peace pact not only as a declaration of good intentions but as a positive obligation to direct national policy in accordance with its pledge." In this respect, President Hoover has aligned himself with the more advanced and liberal thinkers on this matter. The latter feel that the United States is morally obligated not to give economic assistance to a nation which enters upon an aggressive war in violation of the Pact. In other words, the Pact has changed the situation, so that the United States no longer has the option of remaining strictly neutral and allowing such aggressor nation to purchase supplies from us.

The Capper Resolution.—This view is held by Senator Capper of Kansas who, in February, introduced a resolution in the Senate providing: "Whenever the President determines and by proclamation declares that any country has violated the multilateral treaty for the renunciation of war, it shall be unlawful, unless otherwise provided by act of Congress or by proclamation of the President, to export to such country arms, munitions, implements of war or other articles for use in war until the President shall by proclamation declare that such violation no longer continues."

Determining the Aggressor.—It was hardly expected that this resolution would be passed but merely that it would stir up discussion. It will be noticed that it contemplates merely an economic boycott and does not contemplate the exercise of any military force by us against the aggressor. It places a heavy responsibility upon the President, as he would be likely in most cases to find it an embarrassing and difficult task to determine which of two warring nations is the aggressor. A party to any war who is not an aggressor has not of course violated the Pact. Apparently, the only feasible alternative, however, to giving this task to the President would be to accept the decision of the Council of the League as to which nation is the aggressor, but the Senate is evidently unwilling to go that far.

Porter Resolution.—In this connection may be mentioned the less far-reaching resolution introduced in the House by Representative Porter, Chairman of the Committee on Foreign Affairs, authorizing the President to prohibit the exportation of arms or munitions of war from the United States to China or Latin-American countries whenever conditions of domestic violence or international conflict exist or are threatened in such countries.

Kellogg's Views.—Secretary of State Kellogg, in a statement made shortly after the introduction of the Capper and Porter resolutions, declared that in his opinion the anti-war pact was not a mere gesture but rather an instrument that would make it more difficult for nations to declare war. "It is," he said, "a rallying point for the mobilization of world opinion." He added that "the only enforcement behind the treaty is the public opinion of the people." He thus apparently aligned himself with those who think that the pact is of great importance as the embodiment of a moral principle, but do not favor implementing it with economic or other sanctions.

Sino-Russian Test Case.—The first application or test of the Kellogg Pact came in connection with the conflict in Manchuria between China and the Soviet Government of Russia. During the summer Secretary Stimson engaged in informal conversations with the diplomatic representatives of China, Great Britain, Japan, France, and Italy, regarding the situation in Manchuria, and endeavored to see that the attention of the Chinese and Russian governments was called to the treaty. The conflict however, continued and, early in December, the United States Government appealed to the fifty-three nations, signers of the Kellogg Pact, to unite in bringing the pressure of world opinion to bear in putting a stop to further hostilities and to remind China and Russia of their obligations under the Pact. Most of the signatory nations, Japan being the most important exception, acceded to the request of the American Government.

Since the United States does not

have direct diplomatic relations with Russia, our admonition to her was sent through the French Foreign Office. It apparently touched a sore spot with the Russian Government, her acting Commissioner of Foreign Affairs, Litvinoff, replying indignantly and accusing the United States of performing an unfriendly act. Without directly answering this charge, Secretary Stimson issued a statement in which he denied that the message of the American Government was sent from unfriendly motives and declared that "between co-signatories of the Pact of Paris it can never be rightly thought unfriendly that one nation calls to the attention of another its obligations or the dangers to peace which from time to time arise." In spite of the rebuff administered by the Soviet Government, the move initiated by the American Government seems to have accomplished some good.

THE UNITED STATES AND THE LEAGUE OF NATIONS

Move for League Amendment.—A movement has been set on foot to amend the Covenant of the League of Nations so as to adjust it to the new situation created by the adoption of the Kellogg Pact. It is not to be inferred that the two instruments are in conflict with each other. It is true that the Covenant permits war as an instrument of international policy, but this kind of war is not prohibited by the Kellogg Pact whose signatory parties renounce war as an instrument of national policy. By signing the Pact, the United States aligns itself definitely with the general movement for world peace and assumes certain obligations which the members of the League had already assumed. In this sense the Pact supplements the Covenant, and the United States by signing virtually associates itself with the members of the League in endeavoring to accomplish one of the fundamental purposes of the League.

Kellogg Pact and League Covenant.—The Pact was signed not only by the United States but also by several other nations that are not members of the League and thus renders more nearly universal the general movement for peace. Speaking of the relations of the Covenant and the Pact, Sir Eric Drummond, secretary-general of the League, declared that they are in no way opposed but are in fact complementary. The Pact has filled certain gaps which existed in the Covenant.

The League and Monroe Doctrine.—The question as to the relation between the League of Nations and the Monroe Doctrine is one which is likely to arise whenever an international conflict occurs between the United States and a Latin-American country or between two Latin-American countries, especially when the latter are members of the League of Nations. Heretofore it has been found possible to smooth over such situations without bringing on a direct conflict between the United States and the League. This has usually been accomplished through a policy of non-interference on the part of the League. When, however, a frontier clash occurred between Bolivia and Paraguay, both League members the Council of the League reminded them of their obligations under the Covenant not to go to war and even went so far as to suggest the collaboration of the United States in securing the maintenance of the peace between the two countries. Through M. Briand's efforts the two nations were induced to accept the good offices of the Pan-American Conference in smoothing over the controversy.

U. S. Coöperation with the League.—The United States, while avoiding political commitments in connection with the League, has continued to coöperate in the technical and humanitarian activities of the League. Thus in March the United States acceded to the anti-slavery convention drawn up by the League, and the Senate did not see fit to attach any reservation to the instrument. The United States also signed the convention for the suppression of counterfeiting and deposited its ratification of the convention for the abolition of import and export restrictions. Furthermore, the United States continues to coöperate with the League by transmitting to it the texts of treaties to which she has become a party, such as the treaties of arbitration and conciliation with Hungary and Rumania.

THE UNITED STATES AND THE WORLD COURT

The Kellogg Note.—In view of the announced intention of President Coolidge to resume negotiations leading to American adhesion to the World Court, the resolution of Senator Gillett which was to have come up at the December, 1928, session of Congress was allowed to lie over. The result of the President's new move was apparently a note dispatched in February, 1929, by Secretary of State Kellogg to the secretary-general of the League of Nations. This note was the first official action taken by the American Government regarding the World Court since the conditional approval of the statute of the Court by the Senate in 1926. In this note the Secretary of State indicated the objections of the American Government to the conclusions reached by the Conference signatories at Geneva in September, 1926, but expressed the hope that a formula could be worked out for overcoming the impasse.

Root Formula.—The sending of Secretary Kellogg's note of February caused the question of American adhesion to be linked to the general project of revising the Statute. Upon the invitation of the League Council, Elihu Root, a member of the original commission of jurists which drew up the Statute of the World Court, went to Geneva to serve on the committee created by the League Assembly to draw up amendments to the Statute. He combined with his work in this respect an effort to find a way for bringing about American adhesion to the Court. Mr. Root drafted a formula intended to overcome the impasse which had been reached regarding the fifth reservation attached by the Senate to its resolution of 1926 consenting to the ratification of the Court Statute. This provided that the Court should not "without the consent of the United States, entertain any request for an advisory opinion touching any dispute or question in which the United States has or claims an interest."

American Reservations.—The acceptance of this reservation by the signatory powers was deemed by the American Government to be essential to the preservation of her interests, but, on the other hand, the Conference of Signatories meeting at Geneva in 1926 was unwilling to accept it unless (which was not clear) it placed the United States in no superior position to the other powers. The Root formula for solving this difficulty was discussed by a subcommittee of jurists, consisting of Mr. Root, Sir Cecil Hurst of Great Britain and others, who prepared a final draft of the plan which is called officially the "protocol for the accession of the United States to the protocol of signature of the Statute of the Permanent Court of International Justice." The protocol undertakes to meet the various objections raised by the United States. Thus, it provides that the United States may at any time withdraw from the Court. It also provides that the Statute of the Court cannot be amended without the unanimous consent of the contracting parties, and that the Court may not render any advisory opinions secretly.

That part of the Root Plan which undertakes to meet the objection raised by the fifth American reservation is as follows: The United States shall be informed "of any proposal before the Council or the Assembly of the League for obtaining an advisory opinion from the Court, and thereupon, if desired, an exchange of views as to whether an interest of the United States is affected shall proceed with all convenient speed between the Council or Assmbly of the League and the United States. Whenever a request for an advisory opinion comes to the Court, the Registrar shall notify the United States thereof . . . stating a reasonable time limit fixed by the President (of the Court) within which a written statement by the United States concerning the request will be received. If for any reason no sufficient opportunity for an exchange of views upon such request should have been afforded and the United States advises the Court that the question upon which the opinion of the Court is asked is one that affects the interests of the United States, proceedings shall be stayed for a period sufficient to enable such an exchange of views between the Council of the Assembly and the United States to take place."

"With regard to requesting an advisory opinion of the Court in any case (mentioned above), there shall be attributed to an objection of the United States the same force and effect as attaches to a vote against asking for the opinion given by a member of the League of Nations in the Council or Assembly."

"If, after the exchange of views (mentioned above), it shall appear that no agreement can be reached and the United States is not prepared to forego its objection, the exercise of the power of withdrawal . . . will follow naturally without any imputation of unfriendliness or unwillingness to coöperate generally for peace and goodwill."

Protocol Approved.—This report of the committee of jurists was accepted by the Council of the League, which authorized its transmission to the United States and to the signatory states and also directed that it should be presented to the Assembly of the League at its September meeting. At this juncture, Secretary Stimson gave out a statement approving the Root Plan and declaring that "it would effectively meet the objections represented in the reservations of the Senate and would constitute a satisfactory basis for the adherence of the United States." Thereupon, forty-eight signatory states represented at the meeting of the League Assembly signed the protocol. Shortly after the opening of Congress in December President Hoover gave out the text of a letter received from Secretary Stimson declaring it safe for the United States to join the Court under the terms of the Root Plan and urging that the Kellogg Pact, because it commits its signatories to pacific settlement of disputes "renders the World Court more vitally important than ever before." At the same time President Hoover announced that the United States would sign the protocol of accession to the World Court as provided under the Root Plan, and this action was taken Dec. 9, 1929. It remains, however, for the Senate to ratify the protocol in its new form. Charles E. Hughes has taken his seat as a judge of the World Court.

DISARMAMENT

Cruiser Bill.—Congress declined to eliminate the time limit from the Cruiser Bill as recommended by President Coolidge and, as passed by Congress in February, it authorizes the President to undertake, prior to July, 1931, the construction of fifteen cruisers and one aircraft carrier. This action, coming so soon after the approval by the Senate of the Kellogg Pact was criticized by some persons as inconsistent. However, the bill contains a loophole in the provision that "in the event of an international agreement, which the President is requested to encourage, for the further limitation of naval armament, to which the United States is signatory, the President is hereby authorized and empowered to suspend in whole or in part any of the naval construction authorized under this act." Under this provision President Hoover, shortly after the issuance in July of a proclamation declaring the Kellogg Pact to be in force, announced that he had directed the work on this year's cruiser construction program to be suspended. Some members of Congress criticized this action of the President as not being in accordance with the provisions of the Cruiser Construction Act.

Reduction Formula.—Meanwhile, in the Preparatory Disarmament Commission which met at Geneva in April, the American delegation, headed by Hugh Gibson, took a prominent part and suggested a formula for the reduction of armament based not alone on tonnage but also on age, unit displacement, and caliber of guns.

Preliminary Agreement. — Gen. Dawes, our new ambassador to the Court of St. James, at once entered into conversations with Prime Minister MacDonald looking toward an agreement between the United States and Great Britain for the limitation of armaments. It was announced in

September that the two governments had reached a preliminary agreement and would call a formal disarmament conference.

MacDonald Visit. — The negotiations were brought in a spectacular fashion to the attention of the peoples of the two countries by the unprecedented visit of Prime Minister MacDonald to Washington in October. The result of his conversations with President Hoover was apparently all that could be desired. Simultaneously with his visit, announcement was made in London that the United States, France, Japan, and Italy had been invited to attend a disarmament conference in that city in the latter part of January, 1930.

THE INTER-AMERICAN CONFERENCE AT WASHINGTON

A conference on conciliation and arbitration, attended by all the independent American states except Argentina, was held in Washington Dec. 10, 1928 to Jan. 5, 1929. This conference had been authorized by the sixth International Conference of American States in Havana early in 1928. The work of the conference was signalized by the adoption of two important treaties, of which one is known as the General Treaty of Inter-American Arbitration and the other as the General Convention of Inter-American Conciliation. As already indicated, the Conference also extended its good offices in settling the dispute between Bolivia and Paraguay. In May, President Hoover announced the settlement of the Tacna-Arica dispute between Chile and Peru.

RELATIONS WITH NICARAGUA AND HAITI

Nicaragua. — President Moncada, who had been chosen in an election supervised by the United States, was installed in office in January. Conditions in that country were deemed by the Administration at Washington to be sufficiently settled to justify the withdrawal of a part of the American forces. At the end of the year, however, about 1600 American marines still remained there.

Haiti.—In his annual message to Congress in December President Hoover announced his intention to dispatch a special commission to Haiti in order to review and study the entire problem of American supervision of that country under the treaty of 1915 and to enable our Government to arrive at some more definite policy than that now pursued. Four days later, a disturbance occurred in Haiti in which five Haitians were killed by American marines. Our Government then ordered reinforcements and President Hoover asked Congress for an appropriation to pay the expenses of the commission he intended to send there.

RELATIONS WITH CHINA

In April the Nationalist Government of China dispatched notes to the various governments exercising extraterritorial jurisdiction in that country requesting them to take steps looking toward the relinquishment of such right. To this communication the American Government sent its reply in August which, while expressing sympathy with the aspirations of China, declared that, according to its view, there did not yet exist in China a judiciary capable of rendering justice to Americans nor a body of laws adequate to give protection to their lives and property. At the end of the year the United States still maintained a force of about 2600 men in China.

LATIN-AMERICAN RELATIONS

By Graham H. Stuart

Professor, Stanford University

HOOVER GOOD WILL TRIP

The well conceived good will trip of President-elect Hoover to the various countries of the Caribbean and South America at the close of 1928 was an auspicious augury for a period of friendly relations between the United States and Latin America for the coming year. The results have not belied expectations. Not only have there been no disputes between the United States and her Latin-American neighbors, but different progressive steps have been taken to prevent any serious difficulties from arising.

CONFERENCE ON ARBITRATION AND CONCILIATION

Purposes.—The outstanding achievement of the year was the International Conference of American States on Conciliation and Arbitration which met at Washington, Dec. 10, 1928, and adjourned Feb. 5, 1929. This conference was held pursuant to a resolution of the Havana Conference (Feb. 16-28, 1928) providing that the American republics adopt obligatory arbitration for the settlement of their international differences of a juridical character. All the Latin-American countries were present except Argentina, each state being represented by two delegates. The United States was represented by Secretary of State Kellogg and ex-Secretary of State Hughes. Two treaties were signed at this conference, one on arbitration and the other on conciliation.

The General Treaty of Inter-American Arbitration has been called the most advanced multilateral arbitration pact ever concluded. It follows the Briand-Kellogg Pact in its general form, condemns war as an instrument of national policy and provides for settlement by arbitration of all justiciable disputes. Only two general exceptions are provided,—domestic questions and questions concerning third states. For its definition of justiciable disputes it adopts Article 36 of the World Court Protocal verbatim: (a) the interpretation of a treaty; (b) any question of international law; (c) the existence of any fact which if established would constitute a breach of an international obligation; (d) the nature and extent of the reparation to be made for the breach of an international obligation. Any international tribunal may be used or a special one set up. In the latter case each party to the dispute nominates two arbitrators, one a national, the other of any other American nationality. The fifth arbitrator who serves as president of the court is chosen by the other arbitrators. Certain special reservations, made by several Latin-American countries, largely cover questions antedating the treaties and questions regarding the claims of foreigners. The United States, Brazil, Peru, Cuba, Panama, Nicaragua, and Haiti signed without any reservations.

Basis of the Treaty.—The General Convention of International Conciliation uses as its basis the Gondra Treaty signed at the Fifth International American Conference at Santiago, Chili, May 3, 1923. It retains the Commissions of Inquiry of the Gondra Treaty and gives them also the character of Commissions of Conciliation. It covers all controversies between states not settled by diplomacy; it defines the procedure to be used and makes it arbitrary; it sets up permanent bodies to bring about conciliation, and it approves the right of any state to offer mediation. The sole reservation by Chili excluded those questions antedating the convention to cover the Tacna Arica dispute. These two treaties taken together would seem to provide for the principal settlement of any dispute which could arise between the sovereign states of the Western Hemisphere.

BOLIVIA PARAGUAY DISPUTE

Hardly had the Conference been organized before the Bolivian-Paraguayan dispute demanded its attention. The first session adopted a resolution urging the maintenance of friendship and reminding the two countries that peaceful means were available to settle such differences. A committee of five members of the Conference headed by Mr. Hughes was appointed to examine the situation and to coöperate in maintaining good relations between the states. It recommended that the Conference tender its good offices. Both states accepted and a committee of nine was appointed to investigate the dispute and given six months to report. The committee had two representatives from Paraguay, two from Bolivia and five neutrals. Sept. 5, 1929, the neutral members of the committee reported that they had agreed upon a formula setting forth the bases for arbitration of the differences between the two countries. By the formula Paraguay would get title to part of the Chaco Boreal south of the Rio Verde, and Bolivia would receive an outlet to the Atlantic Ocean by the Paraguay River. Other points were to be settled by a board of two judges from each interested country and a neutral judge chosen by agreement. A settlement was reached along these lines, and President Hoover in his first annual message to Congress declared that the Inter-American Commission had successfully terminated the Bolivian-Paraguayan incident.

THE TACNA ARICA DISPUTE

President Hoover's Proposal.—Another direct result of President Hoover's good will trip was the settlement of the long standing Tacna Arica dispute. When approached by officials of the governments of Chili and Peru on his visit, he gladly consented to lend any proper assistance with a view to bringing about a solution. On May 14, the President, not as arbitrator, but in the exercise of good offices at the request of the parties transmitted to the Presidents of Peru and Chili a proposal suggesting a settlement.

Terms of the Settlement.—According to the terms of the settlement the territory was divided into two parts, Tacna going to Peru and Arica remaining in the hands of Chili. The dividing line was to start at a point to be named Concordia and run parallel to the Arica-La Paz Railway. Peru was to receive all the public works constructed in Tacna free of charge and receive in addition an indemnity of $6,000,000. The delivery of the province was to take place thirty days after the ratification of the treaty. Arica was to become a free port and Peru was to have a wharf within a mile of the bay. Peru was also to have a customs house and a station for the railway from Tacna to Arica. The Governments agreed to erect a joint monument on the Morro of Arica to commemorate the settlement.

Ratifications.—Chili accepted the proposal on May 15 and Peru on May 16; ratifications were exchanged at Santiago on July 28. The same day a complementary protocol was published providing against alienation of the territory by either party thus destroying Bolivian hopes for an outlet to the sea upon her own territory. Aug. 29, the province of Tacna, after fifty years of Chilian control, raised the Peruvian flag settling thereby the most thorny and long standing dispute in Latin-American diplomacy.

THE UNITED STATES AND THE CARIBBEAN

Nicaragua.—General Moncada, the Liberal general elected Nov. 4, 1928, in an election supervised by some 7000 American marines, was inaugurated Jan. 1, 1929. His election seems to have brought about a period of tranquillity and political friendliness. General Diaz, the Conservative leader and former President, rode in the same carriage with General Moncada on the day of inauguration and on April 15, Dr. Sacasa, former political leader of the Liberal rebellion, presented his credentials at Washington as Minister to the United States. Although General Sandino remained in the field and carried on a desultory warfare during the early months of 1928, the United States thought it advisable to withdraw several thousand marines. In fact General Moncada in a newspaper interview on April 6 was quoted as having asked for the withdrawal of all the American marines with the exception of a few officers needed to train the *guardia*. A State Department release for the press a few days later indicated that General Moncada had merely expressed the hope that the *guardia nacional* with American officers would soon be strong enough to permit the withdrawal of the main body of marines. In a speech made at Managua, Sept. 16, President Moncada declared: "The United States of America has not come here to conquer. It has come to aid in establishing our liberty and sovereignty. . . . The

United States is our support. Its wish is for liberty and popular government and I as president solemnly declare . . . that the temporary coöperation of the United States was given in order to permit a free and fair election in Nicaragua."

New Canal Project.—The steady increase in traffic through the Panama Canal during the year again raised the question regarding the construction of a canal through Nicaragua. It will be remembered that by the Bryan-Chamorro Treaty of 1916 the United States paid Nicaragua $3,000,000 for the right to construct a canal through Nicaragua by way of the San Juan River and the Great Lake or any other route. Sept. 5 of this year Secretary of War, Good, named an engineering battalion of some 400 officers and men for the purpose of surveying the proposed route.

Panama.—In conection with the Panama Canal it might be noted that the State Department permitted the publication of a dispatch on November 1 stating that conversations were to begin soon with Panama concerning a new canal relations treaty to replace the treaty of 1903. Such a treaty was signed in 1926 but was never ratified by either government because Panama felt that certain provisions could not be reconciled to her status as a sovereign power.

THE UNITED STATES AND THE DOMINICAN REPUBLIC

Dawes Budget Mission. — The United States had the opportunity through a number of its distinguished citizens to perform an important public service for the government of the Dominican Republic during the past year. At the request of President Vasquez, a committee of a dozen business and financial experts who had been associated with General Dawes in the establishment of the American budget system, with General Dawes as chairman, sailed March 29 for Santo Domingo to establish a budget system on somewhat similar lines as that of the United States. General Dawes was careful to state that their work had nothing to do with any question of the internal or foreign policy of the Dominican Republic. After three weeks of intensive work with the fullest cooperation of the governmental officials, the commission turned in a report of some 190 pages containing an executive type of budget law in codified form for an annual budget of $10,000,000. President Vasquez accepted the report, appointed a budget director and subordinates, and expected to have the new system in full operation by January 1, 1930.

THE UNITED STATES AND HAITI

Causes of Conflict.—In Haiti where an American High Commission controls all political matters, and an American Financial Adviser dictates financial policies, and about a thousand American marines stationed at Port au Prince and Cape Haitien make the American occupation effective, a serious situation arose at the close of the year. According to a statement issued by Secretary of State Stimson Dec. 7, the trouble started through a students' strike caused by the Government's reduction of an annual scholarship allotment. The political parties took up the question and certain factions endeavored to bring about strikes in other schools and among Government employees. At Aux Cayes, a small seaport about a hundred miles from Port au Prince Dec. 6 a mob of Haitians attacked the American marines who repulsed them killing five and wounding some twenty more, the marines suffering no casualties. A cruiser was immediately dispatched from Norfolk with a detachment of marines consisting of 21 officers and 469 men.

Hoover Message.—The same day (Dec. 6) President Hoover sent a special message to Congress reviewing developments in Haiti. He requested Congress to authorize the immediate dispatch of an investigation commission to the islands including both Representatives and Senators and to appropriate $50,000 for its expenses. Representative Hamilton Fish of New York promptly introduced such a resolution. Haiti at the close of the year remained the one outstanding problem facing the United States in her Latin-American relations.

THE UNITED STATES AND MEXICO

American Position in Revolt.—The two events in Mexico of particular interest to the United States which transpired during the vear were the abortive revolution in the spring and the presidential election of the fall. Army revolts under the general direction of General Jesus Maria Aguirre broke out in various states throughout Mexico early in March. Provisional President Portes Gil immediately appointed former President Calles as Secretary of War to handle the situation. As soon as it was seen that the revolt had assumed serious proportions President Hoover, who had just been inducted into office, issued a statement declaring that the United States would continue the policy of giving moral and material aid to the Mexican Federal Government, and that the embargo on munitions put into effect by President Coolidge during the de la Huerta uprising of 1924 would remain in force. As evidence of its desire to aid the Mexican Government in a substantial manner the United States War Department arranged to send an initial supply of 10,000 Enfield rifles and 10,000,000 rounds of ammunition to the Federal Army as well as bombs, machine guns and ammunition for use in air planes, with a promise that more would be supplied as they were needed.

Collapse of Revolt.—March 11 Secretary Kellogg announced that the Mexican rebels would not be recognized as belligerents by the United States, thus depriving them of the right to declare blockades, capture contraband, and obtain supplies and loans in the United States. This support aided the prompt and efficient mobilization of Federal troops by Secretary Calles. The Government was soon able to put down the revolt, although a number of sanguinary engagements were fought,—a thousand killed were reported at the Battle of Reforma near Jiminez. General Aguirre was seized and executed before the end of March, and by the middle of May the revolt had completely collapsed.

Results.—One result of the revolution was to postpone the expected negotiations between the Mexican Ministry of Finance and the international committee of bankers for a new debt agreement, since it was felt that Mexico's financial situation offered little prospect of an agreement during the present year.

The Presidential Election which occurred Nov. 17 was bitterly contested by Pascual Ortiz Rubio, the candidate of the Government, and José Vasconcelos representing the opposition. Numerous clashes took place causing some bloodshed but the Government kept control of the situation and its candidate was elected by a considerable majority. Early in December it was rumored that Vasconcelos intended to begin a revolution on the ground that his partisans were kept from the polls thus assuring the election of his opponent. At the date of writing no further developments had taken place.

AMERICAN RELATIONS IN THE ORIENT AND NEAR EAST

By Albert H. Lybyer

Professor, University of Illinois

CHINA

Peace and Progress.—The most troubled area in Asia in 1929 was China, in spite of the fact that the year opened with prospects of peace, harmony and progress. In 1928, the Kuomintang or People's Party had advanced through the capture of Peking and the adhesion of Manchuria and minor successes elsewhere to a position of apparently unified control of all China. The time seemed to have come for initiating the next stage of the Revolution,—a general political and economic reconstruction. Twelve countries, including the United States, had agreed that China should put into effect her own tariff from Feb. 1, 1929, and five, not including the United States, had agreed to relinquish extraterritoriality by Jan. 1, 1930, provided China should establish satisfactory conditions for foreigners in her courts. The American tariff treaty of July 25, 1928, was ratified Feb. 1, 1929. The new tariff provided lower rates than had been expected, mainly on the basis of revenue. A military conference at Nanking in the first days of January proposed a reduction of China's standing army by 1,000,000 men. After reopening discussions Jan. 25 an agreement was reached with Japan March 28 which settled the Tsinan incident of the previous May; a commission was to determine the damages and the Japanese promised to leave Shantung within two months.

New Internal Troubles.—The third national congress of the Kuomintang met at Nanking in March. It was ominous that all the leading generals were absent. Revolts had already begun in Shantung and Honan. Famine conditions prevailed in Honan, Shansi and Kansu. March 10, President Chiang Kai-shek announced his intention of resigning on account of the rebellions, but he did not do so. April 26 the agreement of 1919 as regards the shipment of arms from the United States to China was canceled and such shipment was forbidden except as the President of the United States may prescribe. Late in May, Marshal Feng Yu-hsiang was reported to have declared war upon the Nanking Government, alleging its character to be illegal and unrepresentative. The Central Executive Committee of the Nationalists thereupon passed a resolution dismissing Feng from all offices and from the party. They claimed that he was being supported by Russians. Although it was rumored that he would go into voluntary exile, he remained in command of his army, and on good terms with General Yen Hsishan.

Difficulties with Russia.—In June the Chinese police raided the Russian consulates in Northern Manchuria, and obtained documents proving propaganda which, they felt, justified them in breaking relations. July 10, the Chinese Government ordered the dismissal of all Soviet Russian officials of the Chinese Eastern Railway and replaced them by Chinese and White Russians. Four days later, the Soviet Government protested formally against violation of the Russo-Chinese agreement of May 31, 1924, and suggested a conference, stipulating however, that the Chinese should first restore the *status quo*. Finding the Chinese reply unsatisfactory, the Russians on July 17 broke off diplomatic relations and suspended railway communication. Thus developed a critical situation which engaged international attention anxiously and was not entirely cleared up by the end of the year. The Nanking Government, desirous of suppressing unfavorable news, endeavored to control the dispatches of foreign journalists, and tried vainly to obtain the consent of foreign governments, including that of the United States, to the expulsion of some who refused its censorship.

Restoration of Internal Order.—Revolts increased in different parts of the country. Marshal Feng began moving his troops, the Kuominchun or "People's Army," toward the capital. General Cheng Fa-kwei and his so-called "Ironsides" at Ichang revolted in September. They claimed that the President and his group were corrupt, extravagant, and militaristic. Trouble also developed near Canton and Fuchow. The Government fought some of its opponents and bought the temporary forbearance of others, including, it was said, Marshal Feng. In a general flare-up about the beginning of December, President Chiang Kai-shek seemed to be confronted by a general break-up of his authority. Foreigners left Nanking for refuge in Shanghai. But internal conditions improved rapidly before the end of the year.

Settlement with Russia.—Meantime, desultory hostilities were reported between Chinese and Russians. Informal representations were made by the Japanese, American and British Governments that both China and Russia should act properly as signatories of the Briand-Kellogg Pact. Soviet troops pursued and punished White Russians on Chinese territory. Various attempts at negotiations failed, until in December, when progress was made in dealings between representatives of Manchuria and the Russians toward restoration of good relations. The Chinese accepted restoration of the *status quo*, and the Russians agreed to negotiate important modifications of the agreement of 1924.

Extra-territoriality.—Aug. 9, a note was published from the American Department of State to the Nanking Government, in which the American Government declined to accept the immediate abolition of extra-territoriality, on the ground that China was not in a position to guarantee justice to Americans in the Chinese courts. This was answered Sept. 5 by C. T. Wang, the Chinese foreign minister, who claimed that the Chinese judicial system "does not suffer in the least in comparison with that of Turkey at the time of the abolition of the Capitulations," and requested new discussions. Dec. 28, the Chinese Government issued a "mandate" ordering that from Jan. 1, 1930, "all foreign nationals in the territory of China who are now enjoying extra-territorial privileges shall abide by the laws, ordinances and regulations duly promulgated by the central and local governments of China." The apparent severity of the declaration was however mitigated by an order to the Chinese ministries "to prepare as soon as possible a plan for the execution of this mandate." It was understood that meanwhile the *status quo* would be maintained.

JAPAN

Manchurian Policy.—At the beginning of 1929, Japanese conditions were quiet. Hirohito had been formally enthroned as Emperor and Premier Tanaka possessed a safe majority in the Diet. The premier had announced a positive policy in Manchuria, with the open-door doctrine and respect for Chinese sovereignty.

Cabinet Crisis.—Difficulties developed because of alleged complicity of the Government in the assassination in 1928 of Chang Tso-lin at Mukden, financial scandals within the Seiyukai party, and the unsatisfactory relationship with China. General Tanaka resigned as prime minister July 2 and died on Sept. 29. Various officials of his government were imprisoned on charges of corruption. Mr. Hamaguchi of the Minseito party formed a new cabinet. In view of the fall of exchange and general economic conditions the Government cut the budget by 200,000,000 yen for the following eight months.

Armament Reduction and Kellogg Pact.—The Japanese showed much interest in President Hoover's proposals for the reduction of armament. They were in favor of substantial reduction, but desired that the Japanese quota be increased at some points. Hirohito ratified for Japan the Briand-Kellogg Treaty on June 27.

The Institute of Pacific Relations met at Kioto from Oct. 28 to Nov. 9, with 200 delegates from seven countries around the Pacific ocean. Delegates from the United States played a prominent part in the discussions.

TURKEY

Commercial and Economic Affairs.—Early in the year, the Turkish Government prolonged for another year the commercial *modus vivendi* with the United States, pending the conclusion of a new treaty. The new Turkish nationality law was interpreted to mean that children born in Turkey of foreign parents, either of whom shall have been born in Turkey on or after January 1, 1929, will become Turkish subjects. In June, the Turkish National Assembly passed a new tariff bill, which took effect Sept. 1. Most duties were increased by an average of about 25 per cent. There was extensive importation into Turkey before Sept. 1, with a marked decline immediately after. The Turkish exchange fell off seriously during the latter part of the year, due partly to the tariff situation, and partly to poor crops. During three years before July, 1929, the rainfall in the interior was far below the average. During the summer, on the other hand, so much rain fell in the Smyrna region as to damage the fruit crop seriously.

Financial.—The Government completed an arrangement for the purchase of the Anatolian Railway. On

June 1 it began to make payments under the new agreement as regards the Ottoman pre-war debt.

Language and Education.—The effort continued throughout the year to spread the use of the Latin alphabet and to advance education, especially along practical lines. Adults under forty are required to go to school in the 12,000 classes provided. The circulation of newspapers and periodicals was greatly reduced with the change to the new alphabet. The English language was made the most important foreign language in the schools. In the study of ancient languages, Greek and Latin were ordered to be substituted for Arabic and Persian.

Miscellaneous.—By the treaty of June 22 with France, a new frontier was laid down with Syria. A penal code translated from the German penal code came into force on August 20. Two weeks later, imprisonment for debt ceased to be lawful. Women were given the vote in local elections and hopes were held out that they would soon receive the vote in national elections. When the parliament opened Nov. 1, President Mustapha Kemal Pasha declared that the Government's efforts would be devoted to economic renovation. The American colleges and other philanthropic enterprises in Turkey continue to be protected by the Turkish Government and to prosper.

EGYPT

Internal Affairs.—At the beginning of 1929, the country was quiet under King Fuad and prime minister Mohammed Mahmud Pasha, who were ruling arbitrarily under suspension of the Constitution, with the apparent approval of Lord Lloyd, the British High Commissioner. The treasury contained a surplus of $200,000,000. A budget was arranged later in the year providing for an expenditure of $235,000,000, of which $42,000,000 was to be drawn from the surplus and applied mainly to the extension of public works. The prime minister resigned Oct. 2, and was succeeded by Adly Pasha Yeghen. On the last day of the month, King Fuad decreed the restoration of the Constitution. The Senate was reëstablished at once. Election of a new Chamber of Deputies was ordered, and Jan. 11 was set as the date for opening the new parliament. The election in December was an overwhelming victory for the Nationalists, and Adly Pasha's cabinet was replaced by one under the leadership of Mustapha Pashal Nahas.

Nile Agreement.—In June, an agreement was reached between the Egyptian and the British Governments providing for the use and control of the Nine waters on terms which were believed to be advantageous to both Governments. The king and the prime minister went to Europe in the summer and spent considerable time in England.

New Relations with England.—The advent of the Labor Government in England led to a speedy change in that Government's attitude toward Egypt. The resignation of Lord Lloyd was practically demanded, and he was replaced by Sir Percy Loraine. A new draft treaty was announced on Aug. 6, according to which the British troops were to be withdrawn to the neighborhood of the Suez canal; responsibility for the lives and property of foreigners was transferred to the Egyptian Government, and Britain promised to hasten the abolition of the Capitulations and to help Egypt join the League of Nations. New agreements were to be made regarding the Sudan. An alliance between England and Egypt was established with mutual coöperation in case of war. Ambassadors were to be exchanged.

PALESTINE

During the first seven months of 1929 the country was thought to be settling down. Sir John Chancellor, High Commissioner, was considering a renewed attempt to establish representative government. The British expenditure in Palestine had been reduced to small dimensions. Most of the British officials left on vacation. The discontent of the Arab inhabitants of the country, though suppressed, was great. It was aroused to action in the first place by the resolutions of the Sixteenth Zionist Congress, which met in Zurich at the end of July, and voted that a new agency be appointed composed of Zionists and non-Zionists, and that a budget of $5,000,000 per year should be raised and spent in Palestine. Fighting broke out about the middle of August in Jerusalem and elsewhere. One hundred and twenty-three Jews (some of whom were American-born) and 83 Arabs were killed, and many more were wounded. Much Jewish property was plundered by the Arabs. The British hastened officials and troops to Palestine, and outward quiet was soon restored. The Government began arresting and punishing the guilty. A commission of four Englishmen was appointed to determine the immediate cause of the trouble. The controversy between Jews and Arabs became world-wide. Much was made of the sacredness to both of the Wailing Wall region. The Arabs demanded the abolition of the Balfour declaration and the establishment of constitutional government. The Jews demanded protection, restitution, and often an increase of their privileges with a more active promotion of the national home idea. A Palestine emergency fund was collected in America to the amount of more than $2,000,000.

ARABIA

King Ibn Saud retained active control of central and western Arabia during the year. He was confronted with disobedience on the part of some chiefs, including Feisal ed-Dowish, Ibn Bijad, and Ibn Hithlain. The last named was reported responsible for a raid near Kowait, during which, Jan. 21, Henry A. Bilkerd, the American missionary, was shot while riding in an automobile with Charles R. Crane. The King pursued the rebels and in a battle, March 31, Ibn Hithlain was killed, Feisal ed-Dowish was wounded and captured. Being pardoned later, he revolted again. Ibn Bijad was captured and imprisoned. It was agreed in June that Great Britain and the Hejaz would exchange diplomatic relationships. The King signed a treaty of friendship with Turkey at Mecca on August 3. The Yemen continued throughout the year unfriendly as regards England and the Hejaz, but in treaty relations with Italy and Russia. The treaty with Russia, published in July, recognized the complete independence of the Yemen and provided for free commercial intercourse.

PERSIA

The Government of Riza Shah Pehlevi continued throughout the year a strong and progressive policy. Its slow Westernization proved too rapid for some Persians, particularly in the South, where a revolt broke out in May. Communication was interrupted and fighting continued for two or three months, after which the Government announced the complete restoration of order. American representatives have disappeared entirely from the financial service of Persia. The foreign employees have been reduced to twelve. The revenues of the country showed a noteworthy increase, which was mainly due to payments of royalties from the Anglo-Persian Oil Company. Commercial conditions were disturbed considerably by the accumulation of money in the treasury through taxes on tea and sugar for the building of railways. The survey was completed of the proposed main railway from the Persian Gulf through the capital to the Caspian Sea, and work was begun from the two ends. The southwestern portion is being built by an American company.

AFGHANISTAN

The country continued in serious trouble during most of the year. King Amanullah had visited Europe in 1928, and upon returning to Afghanistan had attempted an extremely rapid introduction of reforms. A revolt broke out near the capital in December, 1928, led by the brigand chieftain, nicknamed "Bacha Sakao," the "water boy," who defeated the King's forces. Amanullah abdicated Jan. 14, attempting to convey the throne to his brother Inayatullah, who also abdicated after three days. The "water boy" then declared himself king under the name of Habibullah Khan, and organized a government which presently controlled central Afghanistan. Europeans were evacuated by airplane from Kabul to Peshawar. Amanullah first retired to Kandahar, but being unable to make headway, left the country in May and proceeded by way of Bombay to Italy. In the meantime, his uncle, General Nadir Khan, collected an army and gradually moved upon Kabul. He succeeded in taking it Oct. 6. A few days later, he captured the usurper and shortly thereafter put him and his principal followers to death. He proclaimed himself king under the title of Nadir Shah. He proceeded toward restoring order, forgiving small offenders, and promoting a moderate degree of Westernization.

THE ITALY-VATICAN ACCORD

BY ALBERT H. LYBYER

PROFESSOR, UNIVERSITY OF ILLINOIS

THE ROMAN QUESTION

The agreement reached in 1929 between the Italian Government and the Papacy is an important link in a very long chain. For the beginnings of the exercise of political influence in and near the city of Rome by the Pope one must look back as far as the career of Leo I, Bishop of Rome from 440 to 461 A. D. After the middle of the eighth century the Pope was a temporal prince, and as late as 1860 he governed the important area in the center of Italy known as the Papal State. The readjustments of that year transferred to the new Kingdom of Italy four-fifths of the papal territory, and the events of 1870 conveyed the remainder. In being separated from a political administration which was at some points open to severe criticism, the Papacy gained distinctly in moral and religious influence. Pope Pius IX and his advisers refused, however, to be reconciled to the situation. The Italian Government passed a Law of Guarantees May 13, 1871, recognizing the Pope as a sovereign, with extra-territorial rights in his palaces, and assigning to him an annual grant of 3,225,000 lire ($622,425) in lieu of his loss of revenue. But the popes for nearly sixty years declined to leave the Vatican palace, or to recognize the kings of Italy, and they held the Law of Guarantees to be a unilateral and invalid declaration. Its main provisions were, however, in effect, except that the annual grant was uncalled for and accumulated in the Italian treasury.

THE ACCORD OF 1929

Mussolini and the Church.—Premier Mussolini, in his extraordinary fusion of new and old, began early to favor the Roman Catholic Church in various ways, as for instance by the introduction of compulsory religious education in the primary schools. In October, 1926, he authorized negotiations with the Vatican, looking toward the settlement of the Roman Question. The business, which was kept very secret, was discussed in its final stages between himself and Cardinal Gasparri, the Pope's Secretary of State. Three documents, a treaty, a concordat, and a financial convention—were signed Feb. 11, 1929, subject to ratification within four months.

Political Provisions of the Treaty.—The Treaty, in 27 articles, elaborated the purpose of its preamble, "to eliminate every cause of disagreement between the Holy See and Italy, and assure permanently to the Holy See a status of fact and right that shall guarantee to it absolute independence in the exercise of its mission in the world." Italy reaffirmed that the Roman Catholic religion is the sole religion of the State, recognized the sovereignty of the Holy See in its international relations, allowed the establishment of the politically independent "Vatican City," exempted the central corporate entities of the church from interference by the State, allowed to the persons and properties of the Papacy extra-territorial rights and immunities, and agreed to exchange an Italian ambassador against a papal nuncio. Article 26 summed up the situation: "The Holy See declares the 'Roman Question' definitely and irrevocably settled and, therefore, eliminated; and recognizes the Kingdom of Italy under the dynasty of the House of Savoy with Rome as the capital of the Italian State. Italy, in turn, recognizes the State of the Vatican City under the sovereignty of the Supreme Pontiff."

New Status of the Church.—The concordat provides the conditions under which the Roman Catholic Church shall exist and exercise its functions within the Kingdom of Italy. Among the provisions of its 45 articles are the following: The church is free to exercise "spiritual power," conduct public worship, and correspond with the Catholic world; apostate priests may not teach or hold public office; archbishops and bishops shall be selected by the Holy See, after submission of names to the Italian Government; they shall take an oath of loyalty to the State; the Holy See condones the acquisition by Italians of former ecclesiastical property; marriages of Roman Catholics shall be by priests, the facts to be communicated to the civil authorities; a program for religious instruction in the secondary schools shall be agreed upon by the Holy See and the State, teachers and texts to be as approved by ecclesiastical authority; all institutions for the education and training of ecclesiastics are subject exclusicely to the Holy See.

The financial agreement provided for a cash payment of 750,000,000 lire by Italy to the Vatican upon ratification of the documents, and the delivery also of five per cent Italian bonds to the value of 1,000,000,000 lire, these payments to be in final settlement of the events of 1870.

EFFECTS OF THE ACCORD

Political and Ecclesiastical.—In the whole process of settlement since 1860, the Italian State has acquired the territorial sovereignty of all the lands formerly in the Papal States, save only about 160 acres which constitute the Vatican City. The total financial compensation allowed the Papacy is $39,225,000 in cash and $52,300,000 in bonds. The Pope remains a political sovereign, though by reason of smallness of territory and fewness of subjects this function is mainly symbolic and honorary. The new State will not, for the present at least, apply for admission to the League of Nations, nor will it enter into alliances or engage in political negotiations. The Roman Catholic religion is the State religion of Italy, but by new laws other religions are tolerated and given full freedom. Christian doctrines in the Catholic form are recognized as "the foundation and capstone" of public education in Italy, but non-Catholic parents may have their children excused from attending Catholic religious classes.

Views of Pope and Premier.—May 13 and May 25 Mussolini spoke at length before the Italian Parliament on the Accord. He said that the church is neither sovereign nor free, but "a sovereign state within the Kingdom of Italy." On May 30, the Pope wrote a letter to Cardinal Gasparri, in which he said: "There are face to face, if not two states, most certainly two sovereignties, in the full significance of that word, each perfect in every sense in its own sphere, which sphere is necessarily determined by the end which each pursues, and to this it is scarcely necessary to add that the objective dignity of the ends pursued determines no less objectively and necessarily the absolute superiority of the Church."

King Visits the Vatican.—In spite of these and other differences, many of which continue unsettled, the ratifications of the Accord were exchanged on June 7. The Pope began occasionally leaving the Vatican grounds, and Dec. 5, King Victor Emmanuel and Queen Helena, amid much pomp and ceremony, paid the first visit of Italian royalty to the Pope. The position and prestige of the Pope, the King, and Signor Mussolini appear all to have been materially strengthened by the Accord.

INTERNATIONAL CONFERENCES

BY RAYMOND LESLIE BUELL

RESEARCH DIRECTOR, FOREIGN POLICY ASSOCIATION

AMERICAN PARTICIPATION

It is a striking fact that with the exception of the conference on Safety of Life at Sea the only important conferences in which the United States government participated during 1929 were conferences held under the auspices of the League of Nations. Representatives of the American government participated in the work of the Special Commission on Supervision of Manufacture of War Material, which met at Geneva in March; and in April Ambassador Gibson made an important speech at the sixth session of the Preparatory Commission for the Disarmament Conference, which gave renewed life to the effort to limit naval armaments. As far as economic and financial questions are concerned, the United States also participated in a League Conference on Counterfeiting Currency, held in April. In November 1929 the United States sent an observer to the League Conference at Paris to consider the adoption of a convention on the treatment of foreign nationals. And in December it participated in a League Conference at Paris for the purpose of bringing into effect an important convention removing foreign trade prohibitions and restrictions. In January official representatives of the United States participated in a meeting of a League Committee on Unification of Transport Statistics. The United States was represented on the committee of experts set up by the International Educational Cinematographic Institute which met in December at Geneva to study the possibility of an agreement for the suppression or reduction of customs duties on educational films.

Moreover a representative of the State Department attended meetings of the Advisory Committee on Traffic in Opium; Surgeon-General H. S. Cumming of the United States Public Health Service attended the meetings of the League Health Committee. A number of American citizens, including Colonel Robert E. Olds, former Under-Secretary of State, and Roland Boyden, representing the International Chamber of Commerce, attended the meetings of the League Economic and Consultative Committee; Lucius Eastman continued to be the American expert on the League Economic Committee; as did Jeremiah Smith, Jr., on the Financial Committee. Professor Adams, the United States Treasury Department expert, accepted an appointment on the League Fiscal Committee. Julia Lathrop attended the meetings of the League Child Welfare Committee; H. L. May attended meetings of the Permanent Opium Central Board, of which he is a member. Dr. C. E. A. Winslow attended meetings of the League Health Committee as technical expert. Nearly a dozen Americans participated in various conferences organized by the League Committee of Intellectual Coöperation.

THE ROOT FORMULA AND WORLD COURT

Undoubtedly the most important expert committee, convened under League auspices, was the committee of jurists which met in March 1929 in regard to the Permanent Court of International Justice. Elihu Root was the American expert on this committee; and while he participated in its work technically in a private capacity, it was believed that he represented the views of the American government. The result of this meeting was the famous Root formula whereby the United States may join the Permanent Court of International Justice upon substantially the conditions laid down in the Senate reservations of 1926.

YOUNG REPARATION PLAN

Another important committee, held outside of the League, in which American experts played a prominent part, was the expert committee which met in Paris and drew up on June 7 the famous Young reparation plan. Owen D. Young and J. P. Morgan were the American experts on this committee. Although the American government was officially represented at the London conference of 1924, held to put into effect the Dawes plan, it was not thus represented at the Hague Conference of August, 1929, to put into effect the Young Plan. An American observer was nevertheless in attendance.

SAFETY-AT-SEA CONFERENCE

The one important conference attended by the United States which was not held under League auspices was the conference on safety of life at sea. This conference met in London, where, on May 31, 1929, a convention was signed, revising a former convention of 1910, dealing with life-saving appliances, radio telegraphy and helm or steering orders. Ocean-going liners must under the new convention carry lifeboats for every passenger.

LONDON NAVAL CONFERENCE

Throughout the greater part of the year 1929, the Hoover administration devoted its attention to preparation for the five-power naval conference which will convene in London Jan. 21, 1930. These preparations included a visit to the United States by Prime Minister Ramsay MacDonald, in October, and also conversations between the Japanese delegation and American representatives at Washington, in December, when the Japanese were en route to London.

AMERICA'S RELATIONS TO THE LEAGUE OF NATIONS AND WORLD COURT

By Arthur Sweetser

Secretariat of the League of Nations at Geneva

DEVELOPMENT OF NORMAL RELATIONS

American Coöperation.—The end of the League's first decade saw America's relationship to it and to the World Court developing towards a normal basis. Old passions had become further confined to a constantly diminishing group. The League was accepted as an integral part of international life. It came to be considered a useful agency with which the United States could, and often for its own advantage should, coöperate. Ten years before, in the confusion and near paralysis of foreign policy caused by the 1920 election, even its recognition had been difficult, as shown in the failure for months to answer communications from Geneva. Shortly, however, public pressure had brought coöperation through the cautious policy of "observers" in certain questions confined almost entirely to the humanitarian field: anthrax, opium, white slavery and health, to which even the bitterest opponent hardly dared object. With favorable results here, coöperation was slowly extended to so-called "technical" questions and certain economic and financial problems such as customs formalities, double taxation and economic statistics. Towards the middle of the decade, a beginning was made in disarmament, which was gradually extended through the Coolidge Naval Conference at Geneva to the present announced policy of concentrating American disarmament efforts about those of the League. In 1926, after a bitter battle, Senate approval had been secured for the World Court project, but with reservations which only in the last month of 1929 had been negotiated to the point where American signature could be given.

American Representation.—By the end of this first decade the United States was being represented in practically all conferences, commissions and committees, where it was to her interest to be represented, except always the central agencies of Assembly and Council. American delegates were more and more frequently seen at Geneva; the old inhibitions which had made their first coöperation so difficult had almost entirely disappeared; the muteness of the first "observers" had given way to the most active, and often decisive, participation of official delegates. The only field still scrupulously avoided was the "political," which, however, escapes delimitation when American delegates discuss in special conferences questions as vital as national defense, tariff policy and the like.

ABSTENTION OF AMERICA FROM CENTRAL AGENCIES

Despite this friendly development, or perhaps because of it, America's absence from the two central agencies of Assembly and Council was becoming increasingly marked. These bodies are undoubtedly the two most important not only of League organization but of international life in general, for the former brings together automatically every September all States Members of the League to discuss any question whatsoever in international life and the latter brings together three or four times a year for practically the same purposes fourteen of the most important nations. It is the Assembly and Council which often originate, and always authorize, that League work in which, in an intermediate state, the United States coöperates; it is these two bodies which often give final approval and always practicable means of execution for the results of that work. Increasingly clear it was becoming, as a result of ten years experience, that it would be in the general interest, America's no less than others', for her to participate in at least such discussions of the Assembly and Council as affect questions in which in another stage she has participated, or will. A precedent was established, therefore, when Congressman Porter, himself no League enthusiast, followed the opium matter through into the Assembly and took his place as the formal representative of the United States in the Assembly Committee handling that subject.

THE HOOVER ADMINISTRATION AND THE LEAGUE

Perhaps the most fundamental event in American relationship to the League in 1929 was the advent of the new administration under President Hoover which would give direction to American foreign policies for at least the next four years. By this change the Government swung still further away from the bitter memories of the 1920 campaign. In previous years President Harding had accepted that election as a plebiscite against the League and President Coolidge had deeply felt its echoes. President Hoover, however, came into office with the League no longer a bitter issue. As Secretary of Commerce, he had evinced an entirely natural policy towards it, sending Department officials to every meeting where American interests were involved. As Presidential candidate he had announced: "Our country has refused membership in the League of Nations but we are glad to coöperate with the League's endeavors to promote scientific, economic, and social welfare and secure limitation of armaments." During 1929, he sent delegates to all meetings of importance to the United States, except the Assembly and the Council; improved the already existing technical and humanitarian coöperation; adopted a positive disarmament policy both at the Geneva Preparatory Commission and at the London Naval Conference; and signed the Protocols for American membership in the Court.

THE KELLOGG PACT

Perhaps next in importance to the change in control of American foreign policy was effected through America's first attachment to a sweeping international commitment in the shape of the Kellogg Pact for the renunciation of war as an instrument of national policy. America's outlook towards the world in general and the League as the authorized agent for peace of the other governments could not but be profoundly affected by her abandonment of isolation in favor of general world association. The question as to how to implement the Kellogg Pact and make it effective in emergency came more and more to the fore in the United States, especially after the Russo-Chinese difficulty; in Europe, similarly, the League Assembly approved, on proposal of the British Foreign Minister, a study to bring the Covenant and the Pact into complete harmony and close the last "gap" in the former by which legal war still remains possible. Inevitably, as experience accumulates, these two documents will tend more and more to focus in a common effort for world peace and to narrow the gulf between the United States and the League on so-called "political" questions.

SENATE RATIFICATION OF LEAGUE CONVENTIONS

The Slave Trade.—The most interesting precedent established in 1929 was the first Senate approval, given in a purely normal way, to international documents drafted through the League. Obviously, American representation at conferences is not effective, nor in some cases even justified, if there is no hope of the results being approved by the treaty-ratifying agency of the Government. Feb. 25, however, the Senate acceded to the League Covenant abolishing slavery and the slave trade, and March 21, the instrument of accession was deposited in the League archives. This was the more interesting because the United States had had no part whatsoever in the drafting of the Convention, having done no more, indeed, than answer several questionnaires by the single sentence that slavery had been abolished in the United States by the Civil War. Moreover, the Convention had not been prepared by a plenipotentiary conference but by the simplest League procedure of special committee, Council, and Assembly. Finally, though the Administration took pains to point out certain formalistic relations with the League and even suggested a reservation thereon, the Senate added nothing except a condition urged by the American Federation of Labor broadening its scope as regards forced labor. The United States thus became the twenty-seventh nation that was bound by this agreement.

Foreign Trade Restrictions.—Sept. 19, 1929, the Senate ratified another League Convention for the abolition of import and export prohibitions and restrictions. Unlike the Slavery Convention, however, American delegates had taken an active part in the League conference for its preparation, and had signed it July 31, 1928. In transmitting it to the Senate, President Coolidge pointed out that these restrictions, which had grown up through the war and the creation of many new states and which seriously affected automobiles, radios, electric machinery, canned goods, oils, fertilizers, etc., "have been and are causing material detriment to American foreign commerce." He also stated that, while the Convention entrusted certain administrative duties to the League, "Those provisions include nothing which could alter the status of a non-member state in respect to the League." Senator Borah, in reporting the unanimous approval of the Foreign Relations Committee, said "it seems to be a treaty in which we are largely the beneficiaries," and quoted Secretary of Commerce Hoover as saying, "that the United States has nothing to lose and considerable to gain" by it. A memorandum by the Department of Commerce added that removal of restrictions on automobiles for Poland and Czechoslovakia would be a "foremost advantage to American foreign trade," offering in the latter country alone an increase in exportation from 1200 to 5000 cars annually. The Convention was ratified in executive session without a roll-call and without further question as to its relation to the League of Nations.

THE WORLD COURT

Signing of Protocols.—Most important of any single action in 1929 was the signing Dec. 9 of the three Court Protocols, the basic one of Dec. 16, 1920, and the two of Sept. 14, 1929, for revision of the Statute of accession of the United States. This question had agitated American public opinion as few others since the Peace Conference. As early as Feb. 24, 1923, President Coolidge and Secretary

Hughes had submitted it to the Senate, which, after three years' bitter struggle and intense public agitation, had, Jan. 23, 1926, approved with reservations American membership in the Court by the large majority of 76 to 17. Then followed a long chain of events:—on March 2, 1926, transmission by Secretary Kellogg of these reservations to the other Powers; soon afterwards refusal by him to attend a Conference called for their application on the ground that they were "clear and unequivocal"; acceptance by that Conference of the first four and partial acceptance of the fifth; consequent declaration by President Coolidge that the matter was "a closed incident"; a year later attempt by Senator Gillett to bring about the discussions suggested by the other Powers; and still another year later President Coolidge made the announcement at a White House breakfast Nov. 24, 1928, that he intended to renew such negotiations.

Kellogg on American Membership.—Meanwhile, at Geneva other events were occurring. The Assembly and Council of the League had elected Charles Evans Hughes as Judge of the Court to succeed John Bassett Moore, and the Council had chosen Elihu Root as member of the Committee of Jurists to consider amendments to the Statute in view of eight years' experience and the second general election in 1930. Feb. 19, 1929, Secretary Kellogg broke the deadlock as to American membership by a second circular letter referring back to the 1926 Conference. "While," he said, "the Government of the United States desires to avoid, in so far as may be possible, any proposal which would interfere with or embarrass the work of the Council of the League of Nations, doubtless often perplexing and difficult," there still remained some element of uncertainty as regards advisory opinions, and the Protocol suggested by the other Powers would not seem to furnish adequate protection to American rights and interests. The American Government felt, nevertheless, that the informal exchange of views suggested "should lead to agreement," all the more so as "there seems to be but little difference regarding the substance of these rights and interests."

The Root Formula.—This communication was at once referred by the Council to the Committee of Jurists considering the revision of the Statute. There Mr. Root presented a formula of agreement understood to have had the approval of both Administration and Senate leaders in Washington. This formula provided that, to meet the Senate provision that the Court should not, without the consent of the United States, entertain any request for an advisory opinion touching any dispute or question in which the United States has or claims an interest, the United States should be informed of any proposal before the Assembly or the Council for such an opinion; if desired, an exchange of views as to whether an interest of the United States is affected or not should proceed with all possible speed; the same weight would be attached to an American objection to asking for an advisory opinion as to that of any Member of the League; if agreement could be reached either by the United States withdrawing its objection, the Assembly or Council abandoning the advisory opinion procedure, or the question being rephrased, the exercise of the power of withdrawal from the Court accorded to the United States could take place without any imputation of unfriendliness or unwillingness to coöperate generally for peace and goodwill.

Acceptance of Revised Protocol.—The Jurists' Committee unanimously adopted this formula and embodied it in a revised Protocol for American accession, which was accepted in June, in so far as the Council was concerned, and formerly transmitted to the United States Government. The Special Conference of signatory States which met in Geneva to consider the revision of the Statute, and to which the question of American accession was later referred, was formally notified that the Secretary of State considered that the Protocol "would adequately meet the objections set forth in the reservations made by the United States Senate and would constitute a satisfactory basis for the United

U OF I
LIBRARY

States to adhere" to the Court, and that, after the other States had accepted it, he would take steps for its signature and ratification. Immediately thereupon, the Protocol was formally accepted without change of a word and the signatures of 50 States, the largest number ever immediately given, were affixed to it. On Dec. 3, President Hoover, in his annual message to Congress, announced his intention to have the Protocol signed on behalf of the United States, and Dec. 9, the American chargé d'affaires at Berne, J. Pierrepont Moffat, affixed the signature. At the same time an expression of appreciation for the courtesy shown by the other Powers was made, and an exchange of letters between the President and the Secretary of State was made public in Washington explaining the whole situation.

DISARMAMENT

An equally decisive policy was shown as regards disarmament. Here it at once became clear that the new Administration intended, first, to use to the utmost the new element introduced into international life by the Kellogg Pact, and, second, to coöperate as fully as possible with the disarmament work of the League. Despite the failure of the Coolidge Naval Conference in 1927, the American delegation to the League Preparatory Commission took the center of the stage at the Sixth Session in April, 1929, with declarations covering both naval and military matters. Ambassador Gibson, fresh from consultations with President Hoover, delivered a communication urgently calling for action. The renunciation of war as an instrument of national policy, he said, should result "in removing doubts and fears which in the past have constituted our principal obstacle." "Limitation," he added, "was being used to describe armaments at higher levels and should give way to "reduction" to visibly lower levels in order to relieve the people of the world of the tremendous burdens of taxation and release large numbers of men from military service for productive effort. The American Government was convinced, he concluded, that "expenditure for disproportionate naval establishments is indefensible in that it can be avoided by a sensible agreement by the naval Powers." Beyond this general declaration forecasting the Naval Conference, the American delegation also took a very definite position in the military discussions, notably announcing that, though opposed to compulsory military training in peace time, the question of land armaments was of chief concern to other Powers, and the United States, as a means to effect agreement, would, therefore, not oppose the French thesis of not counting trained reserves amongst military effectives.

These issues were further pursued in the September Assembly, where the United States was not represented, and in the MacDonald-Hoover conversations in Washington. Their relationship to the work of the League was stressed on all sides, and, when the London Naval Conference was called, statements were made by each Government, including the American, that its work, which grew out of the Preparatory Commission, would be reported to, and become a part of, the latter's final results. As the London Conference was coming together, it was clearly seen that one of its major problems was how best to harmonize the work of a meeting limited in both subject and membership with the later World Disarmament Conference which should embrace all nations and all categories of arms.

ECONOMICS

Counterfeiting.—American coöperation in the League's economic work so strikingly shown at the World Economic Conference of 1927 was continued throughout 1929 in full and normal attendance at all meetings held. In April a plenipotentiary delegation took part in the Conference on Counterfeiting Currency, including Hugh R. Wilson, American Minister in Berne, and William H. Moran, Chief of the Secret Service of the Treasury Department, who had participated in the preparatory work. The delegation contributed effectively to the drafting of a general convention on a subject which is more and more having an international character, and July 20, Mr. Wilson was authorized to affix the American signature.

Commerce.—In November, at the first plenipotentiary Conference in Paris on the Equitable Treatment of Foreigners and Foreign Businesses abroad, the United States was represented by George A. Gordon of the Paris Embassy. At the Conference in December to bring into effect the Convention on Import and Export Prohibitions previously ratified by the United States, the Government was represented by Charles E. Lyon, commercial attaché at Berne, with the announced policy of considering the Convention effective between the United States and those States which had ratified it irrespective of whether or not the full number hoped for were attained.

United States of Europe and Customs Truce.—Subjects of still wider economic interest opened up during the year within the League, such as the proposal for a United States of Europe and a two years' Custom truce, were closely followed by American officials, and, though most of the debates took place in the Assembly the notification regarding the Customs' holiday sent to all League members was also transmitted to Washington and was under consideration at the end of the year. At the same time, when these two questions were referred for detailed study to the Economic Committee, which is composed of individual experts, a direct contact with the United States interests and opinions was afforded the American member, Lusius R. Eastman, President of the Merchants Association of New York, who made a most positive statement on the all-important question of the American attitude towards such European action. American business and prosperity, he said, was deeply interested in and affected by anything contributing to the prosperity of Europe and would, therefore, look with favor on any proposal tending to improve the conditions in so large a market, provided always, of course, that there was no discrimination against American interests.

OTHER AMERICAN OFFICIAL COÖPERATION

International Law.—In addition to these major fields, the United States Government took part in much other League work. In connection with the First Conference for the Codification of International Law called by the League for March 13th at The Hague, largely on the proposal of a Jurists' Committee of which George W. Wickersham had been a member, the Government transmitted detailed replies on the questions of Nationality, Territorial Waters, and Responsibility of States for Damages done to Foreigners, and President Hoover asked Congress for an appropriation of $35,000 for attendance. The State Department continued to transmit all American Treaties for publication in the League Treaty Series, and purchased 30 sets of the latter, complete from 1920, for distribution amongst American Embassies and Legations.

Unification of Transport Statistics.—To meetings of Committees on the Unification of Transport Statistics, delegations were sent consisting of Brig. Gen. Harts, Military Attaché at Paris, Capt. P. C. Grening, European Director of the United States Shipping Board, Fayette Allport and others. Similarly, the invitation to the Committee on Aerial Organization, which may assume considerable importance in coördinating problems of the air, were accepted.

The Humanitarian Field.—Apart from accession to the Slavery Convention, Kenneth Caldwell, Assistant Chief of the Far Eastern Division of the State Department, was present at the Opium Advisory Committee; an annual report and other statements on drug addiction and seizures in the United States were forwarded by the Government; and the so-called "Scheme of Stipulated Supply," previously transmitted through the Government as a suggestion for limiting the production of drugs to legitimate requirements, was distributed by the League to all members and all signatories of the 1912 Convention. Coöperation between the League Health Committee and American official agencies was maintained by Surgeon General Cummings as head of the United States Public Health Service and Vice-President of the League Committee. Similarly, collaboration with the work of child welfare and protection of women and children continued. Finally, a contribution of roughl $2,500 was made by the Governmen towards League expenses, and anothe of 2,000 Straits dollars by the Philippine Government to the Singapore Health Bureau.

THE INSTITUTE OF POLITICS

By Walter W. McLaren

Executive Secretary, Institute of Politics, Williamstown

CONSIDERATIONS BEARING ON INSTITUTE PROGRAM

Political and Economic Factors.—Periodically the relative importance of the political and economic factors in the settlement of domestic or international disputes is brought into the field of general discussion. During the summer the President of Columbia University informed an audience in Southampton that, in his opinion, the center of gravity of human affairs had moved from the political to the economic sphere. In spite of this pronouncement there are many thoughtful people who, while admitting that the economic factor in world affairs is more important than it was ten years ago, will continue to think that grave domestic or international disputes can only be solved by satisfying both the political and economic considerations involved.

Trade Barriers.—Any argument about tariffs as trade barriers reveals the existence of both political and economic factors of importance. The World Economic Conference and the Continuing Committee suggest a cessation of new legislation of an economic nationalist character, and recommend a simplification of the administrative provisions of the tariff laws of the various European countries. More recently the Continuing Committee, at the request of the last Assembly of the League, have advocated a "tariff legislation holiday" during which time no increases of rates or no new rates should be enacted, and a conference is to be called to obtain, if possible, adherence to the plan. But the project of a United States of Europe, as sponsored by M. Briand and others, halts on its way to realization just because nationalists in all States are fearful of the results of a tariff union upon national wealth and power. The political considerations involved in the project overshadow the economic advantages, even where such advantages are admitted.

SCOPE OF DISCUSSION

Topical Division.—Even if the center of gravity in international affairs has not shifted into the economic sphere—away from the political—the managers of the Institute of Politics were of the opinion that in a year in which the Dawes Plan was being revised by a second international Committee of Experts, when the American tariff was before Congress for the purpose of extending the benefits of protection to agricultural products and certain manufactures that in some way or other were not enjoying a fair share of protection, in such a year it was believed that the attention of the whole world would be centered upon world economic and financial stabilization. Hence, in preparing its program for 1929, the Institute of Politics in its ninth session held at Williamstown, Mass., in the month of August, devoted half of its conferences and about half of its lectures to a series of problems in economic stabilization. The other half of its effort was devoted to the political considerations engaging the attention of various countries, including our own.

Economic and Financial.—In the group of economic and financial conferences, the problems of reparations and debts, of currency, banking, and exchange, of international trade, and planned prosperity were discussed. Integrated with these were lectures on the progress toward economic stabilization in Great Britain, in Italy, and in central Europe. The general impression created by the discussion was that Germany could pay reparations; that debts did not need to be cancelled, possibly further scaling down should be attempted, especially in the case of the British debt to us; that the effects of trade barriers should be determined by international organization; that international action should be taken to regulate the exchanges and banks so as to protect trade in merchandise from the worst effects of fluctuations in national credit as indicated by the money market. The plea in all directions was for international coöperation to the end that the various national points of view might be satisfied, while at the same time the maximum consideration should be given to the necessities of other members of the family of nations.

Political.—The political conferences and lectures presented a whole series of national points of view and recent changes in the political organization of many countries. France and its political system were described by Dr. Siegfried in a series of lectures that was both profound and brilliant. Labor Party personalities and policies in England were described and discussed by George Young, a member of that Party; The Fascists in Italy were defended by Count Elia, and the movement was condemned by Dr. Rappard as only suited to countries in which agriculture predominated. Canada's independent national existence, in such close contiguity to the United States, was argued almost to a negative conclusion, while many of our problems of common interest were presented as incapable of solution, notably the St. Lawrence waterway and the drainage of the Great Lakes to the Mississippi valley. Our Mexican and Caribbean relations were presented as distinctly on the mend, and importance was attached to the more intimate contacts that were resulting from the air mails and highways, as well as wireless and telegraphic and telephonic communications. At no previous session of the Institute was more emphasis placed upon international coöperation, in the procuring of information and in the solution of conflicting points of view by compromise. International good will, even in the presence of keen economic rivalry, can remove mountains.

THE INSTITUTE PROGRAM

Lecture Courses.—The following courses of lectures were given: "Europe's Economic and Industrial Progress," by Dr. William E. Rappard of Geneva, member of the Permanent Mandates Commission and Swiss Delegate to the League of Nations and "The Political System in France," by André Siegfried of Paris, economic expert of the French Foreign Office and professor at the School of Social Sciences. In addition there were addresses delivered by the following: "Labor Policies in England," George Young, of London, former member of the British Foreign Office; "Modern Italy: Political and Economic Conditions," Count Giovanni Elia of Rome, originator of the "Elia Rota Ship" and "The Present Position and Future Prospects of British Industry," T. E. Gregory of London, Cassel Professor of Banking at the University of London.

Round Tables.—The following is a list of the round table subjects, with their respective leaders: Canadian-American Relations, Dean P. E. Corbett, McGill University; Limitation of Armaments, Admiral C. L. Hussey, U. S. N., retired; The Interests of United States Citizens in Latin America, Professor Herbert I. Priestley, University of California, and Post War Constitutional Changes in Europe, George Young, London.

Conferences.—A group of four conferences, under the title, "World Economic Stabilization," were as follows: Planned Prosperity: The Effect of Public Fiscal Policies on Trade and Employment, Dr. William T. Foster and Waddill Catchings; Banking, Currency, and Exchange, Professor T.

E. Gregory, London; Trade Relations as Affected by Politics, Science and Finance, Dr. Harrison E. Howe, Washington, D. C., and Inter-ally Debts and Reparations, Professor Jacob Viner, University of Chicago.

Special general conferences were held as follows: Mexico: Financial, Social and Political Changes Since 1910 under the direction of Dr. Eyler N. Simpson, Mexico City; Financial and Commercial Relations with Latin America under the leadership of Professor Harry T. Collings, Wharton School of Finance and Commerce, University of Pennsylvania; American-Canadian Mineral Resources led by Professor C. K. Leith, University of Wisconsin, and Chinese-Russian Relations led by Professor George H. Blakeslee, Clark University.

THE INSTITUTE OF PACIFIC RELATIONS

By George G. Wilson
Professor, Harvard University

Development.—The Biennial Conference of the Institute of Pacific Relations was held at Kyoto, Japan, Oct. 28 to Nov. 9, 1929. The previous conferences in 1925 and 1927 were held in Honolulu. (See American Year Book, 1928, p. 78.) These conferences are unofficial. The first conference was largely an experiment aiming to discover the problems of the Pacific area and it showed the need of extended study for intelligent appreciation of facts and at the same time the lack of sources from which such appreciation could be gained. There was an endeavor to have before the second conference such data as might be helpful for thorough discussion. This was a difficult problem as there was involved about one half the population of the world scattered upon one half the world's area, a population varying in language and interests. From the experience of the conferences of 1925 and 1927, an attempt was made to anticipate what would be the character of the conference of 1929 and to meet its needs by prior preparation.

Attendance and Scope.—Including members from the countries about the Pacific together with members from Great Britain and unofficial observers from the League of Nations, Soviet Russia, The Netherlands and Mexico, the Kyoto Conference numbered about 200. In this number were some of the leading men and women from all walks of life, the endeavor being to make the personnel of each conference so far as possible a cross section of the life of each country. Publicists, missionaries, capitalists, labor leaders, academic leaders, business men, experts in many lines, join in frank exchange of opinions and ideas with the knowledge that what they may say is not for publication and that it may be possible to change an opinion after hearing another side of the case presented. In his opening address the Chairman, Dr. Inazo Nitobé, said,

> "We meet here under circumstances which I hope will not strain our patriotism or overtax our piety. Not for indictment of others, not for propaganda of our own faith, not for a passionate appeal for a national cause, not to settle a controversy, but for the deliberate orientation of problems that may cast a shadow over the Pacific, have we come together."

Manchurian Problems.—The problem occupying the foremost place and bristling with possible difficulties was that of the status of Manchurian relations. In these China, Japan and the Soviet had direct concern. While the area of Manchuria is only about one twelfth of China, it is about the same as that of all the states of the United States bordering on the Atlantic Ocean and has about 85,000,000 acres under cultivation. The population is about 21,00,000 or about one-half that of France. Manchuria is but a few days trip from some of the famine regions of China and millions of Chinese have migrated. There is a considerable network of railroads operating in Manchuria and more are under construction. Japanese control of some of these roads has brought a high standard of efficiency and the trip to London *via* Manchuria and Russia requires about one-third the time and one-half the cost of the journey by other routes. Mining and other resources have been developed. Flourishing cities and ports exist and Manchuria is an area, the economic and political control of which might naturally be coveted by neighboring states. Much of the area was within limits which had been the subject of treaty stipulations in regard to which there were differences of interpretation. Chinese claimed the sovereignty, Japan maintained treaty privileges and rights based on enormous expenditures of men and money to stabilize and develop Manchuria.

Population and Resources.—Closely related to all the questions coming before the 1929 Conference was the result of investigations which had been previously made in the several countries upon population and resources. The large number of practical business men who were members of the conference gave to consideration of such matters particular significance.

Exterritoriality.—As in the Conferences of 1925 and 1927, the subject of exterritoriality was a central topic of discussion. This was more emphasized because of recent contentions which China had put forward in communications to powers still having exterritorial rights in China. These rights as a consequence of the World War had terminated as regards Germany, Austria and some other states. The immediate denunciation at the end of 1929 was advocated by many in China. These maintained that the courts gave ample guarantee of the rights of foreign persons and property in China, but many of the non-Chinese maintained that these agencies were not yet sufficiently developed. There is not any substantial opposition to the abolition of exterritoriality when adequate protection is assured for foreign rights but there was a wide difference of opinion as to what constituted adequate protection.

Foreign Concessions.—Foreign concessions now number about fifteen and vary in organization but are in the main administered by foreigners. Originally established for trading purposes, some of these have grown into great commercial centers in which foreign consular jurisdiction prevails. The treaty of Nanking of 1842 and later treaties set forth the terms of settlement. Some of the settlements have been returned as a consequence of the World War or for other reasons. Shanghai has long been a place of central attention and was naturally much discussed. If exterritoriality should be summarily abolished, difficult problems would arise in the concessions. Gradual adjustments would seem to be essential rather than precipitate action.

Other Topics.—Many other technical, cultural and political subjects were discussed in which wide divergences of opinion were evident. The diplomacy of the Pacific under treaties of differing provisions, the Kellogg pact, the Washington treaties of 1922, and many other agreements are far from simple.

COGNATE SOCIETIES

GENERAL

ACADEMY OF POLITICAL SCIENCE IN THE CITY OF NEW YORK, Fayerweather Hall, Columbia University, New York, N. Y.

AMERICAN PEACE AWARD, 565 Fifth Ave., New York, N. Y.

AMERICAN SOCIETY OF INTERNATIONAL LAW, 2 Jackson Place, N. W., Washington, D. C.

ARBITRATION SOCIETY OF AMERICA, INC., 342 Madison Ave., N. Y. C.

CARNEGIE ENDOWMENT FOR INTERNATIONAL PEACE, 2 Jackson Place, N. W., Washington, D. C.

COUNCIL OF ARBITRATION, 342 Madison Avenue, New York, N. Y.

COUNCIL ON FOREIGN RELATIONS, INC., 25 West 43rd Street, New York City.

EMERGENCY FOREIGN POLICY CONFER-

ENCE, 1414 Monadnock Block, Chicago, Ill.

FOREIGN POLICY ASSOCIATION, 18 East 41st Street, N. Y. C.

INSTITUTE OF CURRENT WORLD AFFAIRS, 522 Fifth Avenue, New York City.

INTERNATIONAL LAW FOUNDATION, 165 Broadway, New York, N. Y.

INTERNATIONAL REFORM FEDERATION, 206 Pennsylvania Ave., S. E., Washington, D. C.

LEAGUE OF NATIONS NON-PARTISAN ASSOCIATION, 6 E. 39th St., New York, N. Y.

LEAGUE OF NATIONS UNION, 70 Fifth Ave., New York, N. Y.

NATIONAL COUNCIL FOR PREVENTION OF WAR, 532 17th St., N. W., Washington, D. C.

PEOPLE'S RECONSTRUCTION LEAGUE, 35 B. St., N. W., Washington, D. C.

WOMEN'S INTERNATIONAL LEAGUE FOR PEACE AND FREEDOM, 15 E. 40 St., New York, N. Y.

WOMEN'S PEACE SOCIETY, 20 Vesey St., New York, N. Y.

WOMAN'S PEACE UNION, 39 Pearl Street, New York, N. Y.

WORLD PEACE FOUNDATION, 40 Mt. Vernon St., Boston, Mass.

REGIONAL

ARMENIA - AMERICA SOCIETY, 289 Fourth Ave., New York, N. Y.

AMERICAN COMMITTEE FOR ARMENIAN INDEPENDENCE, 1 Madison Ave., N. Y. C.

AMERICAN ASIATIC ASSOCIATION, 501 Fifth Ave., New York, N. Y.

CHINA SOCIETY OF AMERICA, 19 West 44th Street, New York, N. Y.

COMMITTEE ON COÖPERATION IN LATIN AMERICA, 419 Fourth Ave., New York City.

ENGLISH-SPEAKING UNION OF THE U. S., 19 West 44th St., New York, N. Y.

FAR EAST CONFERENCE, 25 Beaver St., New York, N. Y.

FRENCH INSTITUTE OF THE UNITED STATES, 22 East 60th Street, New York, N. Y.

FRIENDS OF BELGIUM, 32 Broadway, New York, N. Y.

FRIENDS OF FREEDOM FOR INDIA, 799 Broadway, New York, N. Y.

FRIENDS OF IRISH FREEDOM, 280 Broadway, New York, N. Y.

JAPAN SOCIETY, INC., 36 West 44th Street, New York, N. Y.

NATIONAL ASSOCIATION FOR PROTECTION OF AMERICAN RIGHTS IN MEXICO, 17 Battery Pl., City.

NETHERLANDS ASSOC. OF NORTH AMERICA, 179 South Trenchard Street, Yonkers, N. Y.

PAN AMERICAN SOCIETY OF THE U. S., INC., 67 Broad Street, N. Y. C.

PAN-PACIFIC UNION, Honolulu, Territory of Hawaii.

PERSIA SOCIETY, 110 E. 42nd St., New York, N. Y.

SOCIETY OF THE FRIENDS OF ROUMANIA, INC., 36 W. 44th St., N. Y. C.

PART TWO
AMERICAN GOVERNMENT

DIVISION III
THE NATIONAL GOVERNMENT

PERSONNEL OF CONGRESS, 1929-1930

By Milton Conover

Professor, Yale University

COMPOSITION OF CONGRESS

House.—There has been a popular supposition that the Congress is overwhelmingly provincial due to the propensity of electors to choose only natives of their respective constituencies. This assumption received contradiction from the composition of the 71st Congress as it did from that of the two preceding Congresses; for there were 137 House members representing 41 commonwealths who were born outside of their respective states—fourteen of them being natives of foreign countries. Of these, twenty-seven sent to Congress more than one non-native. New York sent 12, Illinois 8, Pennsylvania, Michigan and Oklahoma each chose 7; while Massachusetts, New Jersey, Ohio, Kansas and Texas each sent 6 migrants. It may be noted that all of Washington's five representatives were migrants, as well as Colorado's four and Idaho's two.

Senate. — Seventeen states sent adopted sons only, while seventeen other States sent native sons only. The states electing migrants for both senatorships were representative of several sections: the Northern States of New Hampshire, Connecticut, New York and Delaware; the Southern States of Tennessee and Florida; the Western States of Nebraska, Colorado, Wyoming, North Dakota, Montana, Idaho, Washington, Nevada, Oklahoma, and Arizona. The seventeen commonwealths choosing native sons for their two senators were quite as well distributed; Vermont, Massachusetts, Ohio, Illinois, Wisconsin, Utah, Oregon, and the Southern States of Maryland, Virginia, West Virginia, North and South Carolina, Georgia, Alabama, Mississippi, Louisiana and Texas. The other states sent one native and one adopted son, except Pennsylvania, which elected natives for both places.

Environment Factors.—If early environment is a controlling factor in the shaping of a Congressman's viewpoint, then in the 71st Congress the rural areas, the villages and the smaller cities should realize this much advantage over the larger cities, for an overwhelming majority of the Representatives were born outside of the larger cities. As for the Senate, it seems that no city could be called the birthplace of more than one contemporary Senator except Providence, where Senator Metcalf of Rhode Island and Senator Sackett of Kentucky were born.

Age Factors.—The maturity of the members of the 71st Congress was approximately as seasoned as that of its two predecessor bodies, twenty-seven of them having been born before the Civil War began in 1861. During the Civil War period, 1861-1865 inclusive, thirty-seven Representatives and seventeen Senators of the 71st

Congress were born. Hence, their early memories of the sectional strifes of the Reconstruction period must have lingered, as well as those who were born during the period 1866-1876 inclusive. Of this latter group, there were 164 representatives and 40 Senators. Consequently, the memories of those sectional struggles were well distributed throughout the several states, at the same time that the Congress was being endowed with their maturity of wisdom. For the aggregate of Congressmen who were beyond fifty years of age comprised 228 Representatives and 71 Senators, leaving in both Houses a minority of men who were under middle age.

EDUCATIONAL EQUIPMENT

College Representation.—The 71st Congress includes 252 House members who attended standard colleges and Universities—67 per cent—while the Senate contained 69 college men or 72 per cent of its 95 members. All of the states sent at least one college man to the House, excepting Delaware and Wyoming, which elected only one member each. College men only were elected as Representatives from thirteen states: Maine, New Hampshire, Vermont, Rhode Island, Virginia, Mississippi, Colorado, North Dakota, Utah, Montana, Idaho, Oregon, and New Mexico. College men only were elected to the Senate from twenty-five states; New Hampshire, Massachusetts, Connecticut, and New York; the Southern group comprising West Virginia, Kentucky, North Carolina, South Carolina, Tennessee, Alabama, Georgia, Florida, Louisiana, Mississippi and Texas: and the Western block including Ohio, Indiana, Illinois, South Dakota, Minnesota, Utah, Montana, Nevada, Arizona and Oregon. Three states sent no college men at all to the Senate. They were Vermont, New Jersey and Wyoming. Here that conventional American type, the "self-made man" won the highest places in state politics.

University Degrees.—In computing the University degrees held by Congressmen, an attempt has been made to confine the study to those degrees that were earned *in cursu* by actual collegiate residence. In the House of the 71st Congress there were 107 holders of the standard degree of Bachelors of Arts, 22 Bachelors of Science, 139 Bachelors of Law, and 18 holders of other bachelor degrees, making a total of 286 baccalaureates including duplications. In the Senate there were 28 Bachelors of Arts, 28 Bachelors of Law, and eleven others of the bachelor rank—a total of 67 baccalaureates including duplications. The Master of Arts degree had been attained by 28 representatives and 10 Senators. The doctorate had been achieved *in cursu* by very few Congressmen. In the House there were five Doctors of Philosophy, and one Doctor of Science; and in the Senate there were two M.D.'s and one Ph.D. The honorary LL.D. had been granted to 21 Representatives and 27 Senators. More than one degree was held by 103 Representatives and by 23 Senators. Apparently these 126 Congressmen earned their degrees *in cursu*, their second degrees representing post-graduate study either of a professional or of an academic character. This would indicate a reservoir of scholarship that might well rival the average university faculty, excepting that most of the graduate mark of these statesmen was confined largely to the law thereby preventing the diversity of academic viewpoint that characterizes the university faculty.

PROFESSIONAL AFFILIATIONS

Lawyers.—Professionally, 237 Representatives or 54 per cent of their number were lawyers, as were 55 Senators or 57 per cent. Many of these lawyers had other interests, but the law seemed to be a dominant factor in their professional relationships, as it was with the members of the preceding two Congresses. The largest delegations of lawyer-representatives were elected from areas widely remote from each other territorially, if not in economic and political interest also. Thus, New York chose from the legal profession 15 of her 43 Representatives in the House; Texas 14; Pennsylvania 13; Missouri 10; Ohio, Illinois, Tennessee and Georgia 9 each.

Business had occupied 85 Representatives and 15 Senators, including a few manufacturers and bankers.

Journalism ranked third as an avenue to Congress, 15 representatives having attained the Citadel by this route as did 9 Senators.

Educators.—A small measure of the academic tone of European parliaments may be claimed for the 71st Congress in that the House admitted 16 educators, including eight college professors and two former college presidents—James B. Aswell, of Louisiana, former president of the Louisiana State Normal College, and chancellor-elect of the University of Mississippi; and Willis C. Hawley, of Oregon, former president of Willamette University. Henry St. George Tucker, former dean of the Law School at Washington and Lee University continued to represent Virginia in the House. The Senate contained two educators, both of them college professors—Charles L. McNary of Oregon, former dean of Law at Willamette University; and Simeon D. Fess, of Ohio, former president of Antioch College.

Other Professions.—Among the claimants to other professions in the House were four physicians, four agriculturists, three engineers, and two each of ministers of religion, dentists and miners. In the Senate, there was approximately the same number of these callings represented. Despite the prominence of the labor movement and of the farm bloc, there was a conspicuous dearth of manual laborers and of "dirt farmers" in the Congress.

POLITICAL EXPERIENCE

Local.—Previous political experience in state or in local Governments was acknowledged by 308 or 70 per cent of the Representatives of the 71st Congress and by 70 Senators or 73 per cent. This compares favorably with the experience records of the two preceding Congresses, and it indicates a great increase in Congress of experienced personnel. Local government positions such as township and county offices has served as preliminary training schools for 120 Representatives and for 20 Senators. The county solicitorship or attorneyship trained the greatest number of Congressmen, but the county superintendency of education, the county legislature, the county clerkship, and the county sheriff's office were well represented. Besides this list there were 17 Representatives who had served as county judges and 11 who had served as postmasters—positions that can scarcely be classified as local government offices exclusively.

City politics had provided public experience for 118 or 25 per cent of the Representatives, and for 16 Senators or 16 per cent. The city mayoralty had the greatest number of alumni in Congress of all the city offices reported, there being 34 Representatives and 7 Senators who had been mayors of municipalities. Thirty-three Representatives have served in city councils or commissions, 25 had been city attorneys, 17 had been members of boards of education, ten had been city superintendents of schools, and 32 had filled similar city offices.

State positions had been served by 279 Representatives and 90 Senators of the 71st Congress. The state legislatures had afforded experience to a greater number of parliamentarians of this Congress than had any other state government agency. They had trained 167 representatives and 38 Senators. Three Representatives and twenty-two Senators had served as governors of states, and four members of each House had been a lieutenant governor, while nineteen Senators and thirty-nine Representatives had served in other branches of the state administration. Twenty-three Representatives and six Senators had been members of state judiciaries. Thirteen Representatives and four Senators had been members of State Constitutional Conventions.

National Politics.—368 Representatives had had previous experience in Congress and 29 Senators had previously served in the Lower House. Fifteen Representatives and seven Senators had been presidential electors. Other positions in the National Government to the number of 41, had been filled by the Representatives and 13 of such positions had been filled by the Senators. Some of these positions, however, may have been filled by the same man before he entered Congress, so that the number of different members of the 71st Congress who had had previous experience in the administrative branch of the National Government was very small. The positions occupied by them were those such as directors of the Bureau of the Census, chairman of the Federal Trade Commission, collector of internal revenue, register of the General Land Office, etc.

WAR VETERANS

Civil War.—From both Houses it seems that the last veteran of the Grand Army of the Republic has disappeared with the passing of the late Representative Isaac B. Sherwood of Ohio and Senator Francis E. Warren of Wyoming. One veteran of the Confederate Army remained in the House in the person of Clarence M. Stedman of North Carolina—the sole survivor of the Civil War to remain in the Congress. He was born in 1841, served throughout the War in Lee's army, was wounded three times, became a Major, and was at the Surrender at Appomatox.

Spanish and World Wars.—In the House also sat 19 Spanish War and 61 World War veterans, besides one War nurse, one relief worker and two Red Cross aids. In the Senate sat seven veterans of the Spanish War and 16 veterans of the World War. Of the 74 War servants who sat in the House, 16 had served as captains, 9 as majors, 7 as lieutenants, 7 as privates, and four as non-commissioned officers. There were also four lieutenant-colonels, two colonels and one brigadier-general and two ensigns of the Navy.

RELIGIOUS AND FRATERNAL AFFILIATIONS

Church Classifications.—Religious affiliations were acknowledged by 229 Representatives and 47 Senators of the 71st Congress. In the House there were 58 Methodists, 41 Presbyterians, 34 Congregationalists, 15 Roman Catholics, 12 Christian (Disciples), 11 Lutherans, 2 each of Quakers and Universalists, and one each of Unitarian, Church of Christ, Later Day Saints, and the Protestant faith. In the Senate the 47 Churchmen included 14 Methodists, 11 Episcopalians, four each of Baptists, Congregationalists, and Presbyterians, three Unitarians, two each of Roman Catholics, Lutherans, Later Day Saints, and one Protestant.

Lodge membership is claimed by 214 Representatives and by 33 Senators of the 71st Congress. In the Lower House there were 188 Free and Accepted Masons of whom 62 were members of the Mystic Shrine, 43 were Knights Templar, 48 were Masons of the 32nd degree and three were of the 33rd degree. In the Senate, the Masons numbered 29, of whom six were of the Mystic Shrine, three Knights Templar, six of the 32nd degree and two of the 33rd degree. The Benevolent and Protective Order of Elks ranked second in numbers in both Chambers there being 92 Elks in the House and 12 in the Senate. Of Knights of Pythias, there were 60 Representatives and 8 Senators. There were 52 Odd Fellows in the House and 9 in the Senate. In the House there were 39 Woodmen, in the Senate five. Of the Loyal Order of Moose, there were 16 in the House and two in the Senate. Other lodge memberships in the House included ten Red Men, 9 of the Jr. O. U. A. M., and 8 Eagles. There were representatives also of the Knights of Honor, Sons of America, the Grotto, Patrons of Husbandry (Grange), Maccabees, United Workmen, Eastern Star, Druids, Knights of Columbus, Patriotic Sons of America, Foresters, B'nai B'rith, Queens' Daughters, Catholic Daughters of America, Royal Arcanum and one Knight Khorassan. In the Senate there were likewise representatives of the Red Men, United Workmen, and of the Patrons of Husbandry.

LITERARY MEN IN CONGRESS

Several authors laid aside their pens and became men of action in the 71st Congress. The House contained 11 well recognized writers, and the Senate received three. Besides scholars of political affairs there were authors of various subjects, including one poet. Congressman Anthony Jerome Griffin, the "Poet Altair" of New York City, who was a prize essayist during his student days at New York University, was the unknown author of the poem entitled "Chaos," published shortly after the Armistice of 1918. He wrote also the book *War and Its Aftermath* which appeared in 1922. Congressman Louis Leon Ludlow of Indiana produced three books, suggestive of the ambitious spirit of the mid-nineteenth century American of the old Middle West. Thus: *From Cornfield to Press Gallery; In the Heart of Hoosierland; Senator Solomon Spiffledink.* These volumes were all produced after 1923, however. Congressman Cyrenus Cole of Iowa has presented much of the flavor of the Trans-Mississippi West in his *History of The People of Iowa; A Bit of Holland in America; The Two Great Canyons;* and, *From Four Corners to Washington*—with its later companion volume, *From Washington to Four Corners*, published in 1922.

The Senate of the 71st Congress was favored with three outstanding creative writers: Senator Arthur H. Vandenberg of Michigan; Simeon D. Fess of Ohio; and Hiram Bingham of Connecticut. When Mr. Vandenberg was appointed to fill a vacancy in the Senate in 1928, he had written three books and three booklets and several magazine articles. His first book published in 1921 appeared with the challenging title *Alexander Hamilton, The Greatest American.* The sequel appeared two years later, with consideration to contingencies *If Hamilton Were Here To-day.* His booklets were devoted chiefly to such public problems as The Right of Industrial Petition; and, Pre-Primary Convention System. Mr. Fess, former President of Antioch College, published five books; the chief titles being his *History of American Political Parties and Political Theory;* and, his *Problems of Neutrality.* All but the last of these volumes were published before the Senator entered the House of Representatives in 1913. Mr. Bingham entered the Senate in 1925, with six books to his credit, including his Journal of an Expedition Across Venezuela and Colombia; Inca Land; and, other works relating to South America.

MEMBERS OF THE SENATE

Compiled from the Congressional Directory, Year 1929

Dates show beginning of service in the Senate. Names of Republicans are in Roman type; those of Democrats in *Italic;* Farmer-Labor in ROMAN CAPS.

ALABAMA

J. Thomas Heflin (1920).
Hugo L. Black (1926).

ARIZONA

Henry F. Ashurst (1912).
Carl Hayden (1927).

ARKANSAS

Joseph T. Robinson (1913).
T. H. Caraway (1921).

CALIFORNIA

Hiram W. Johnson (1917).
Samuel M. Shortridge (1921).

COLORADO

Lawrence C. Phipps (1919).
Charles W. Waterman (1926).

CONNECTICUT

Frederic C. Walcott (1929).
Hiram Bingham (1924).

DELAWARE

Daniel O. Hastings (1929).
John G. Townsend, Jr. (1929).

FLORIDA

Duncan U. Fletcher (1909).
Park Trammell (1917).

GEORGIA

William J. Harris (1919).
Walter F. George (1922).

IDAHO

William E. Borah (1907).
John Thomas (1928).

ILLINOIS

Charles S. Deneen (1925).
Otis F. Glenn (1928).

INDIANA

James E. Watson (1916).
Arthur R. Robinson (1925).

IOWA

Smith W. Brookhart (1922).
Daniel F. Steck (1924).

KANSAS

Henry J. Allen (1929).
Arthur Capper (1919).

KENTUCKY

Frederic M. Sackett (1925).
Alben W. Barkley (1927).

LOUISIANA

Joseph E. Ransdell (1913).
Edwin S. Broussard (1921).

MAINE

Frederick Hale (1917).
Arthur R. Gould (1926).

MARYLAND

Phillips Lee Goldsborough (1929)
Millard E. Tydings (1923).

MASSACHUSETTS

Frederick H. Gillett (1925).
David I. Walsh (1926).

MICHIGAN

James Couzens (1922).
Arthur H. Vandenberg (1928).

MINNESOTA

HENRIK SHIPSTEAD (1923).
Thomas D. Schall (1925).

MISSISSIPPI

Pat Harrison (1919).
Hubert D. Stephens (1923).

MISSOURI

Roscoe C. Patterson (1929).
Harry B. Hawes (1926).

MONTANA

Thomas J. Walsh (1913).
Burton K. Wheeler (1923).

NEBRASKA

George W. Norris (1913).
Robert B. Howell (1923).

NEVADA

Key Pittman (1913).
Tasker L. Oddie (1921).

NEW HAMPSHIRE

George H. Moses (1918).
Henry W. Keyes (1919).

NEW JERSEY

Hamilton F. Kean (1929).
David A. Baird, Jr. (1929).

NEW MEXICO

Sam G. Bratton (1925).
Bronson Cutting (1929).

NEW YORK

Royal S. Copeland (1923).
Robert F. Wagner (1926).

NORTH CAROLINA

Furnifold M. Simmons (1901).
Lee S. Overman (1903).

NORTH DAKOTA

Lynn F. Frazier (1923).
Gerald P. Nye (1925).

OHIO

Simeon D. Fess (1923).
Roscoe C. McCulloch (1929).

OKLAHOMA

W. B. Pine (1925).
Elmer Thomas (1927).

OREGON

Charles L. McNary (1918).
Frederick Steiwer (1926).

PENNSYLVANIA

David A. Reed (1922).
William S. Vare (1928).

RHODE ISLAND

Felix Hebert (1929)
Jesse H. Metcalf (1924).

SOUTH CAROLINA

Ellison D. Smith (1909).
Coleman L. Blease (1925).

SOUTH DAKOTA

Peter Norbeck (1921).
W. H. McMaster (1925).

TENNESSEE

Kenneth McKellar (1917).
William E. Brock (1929).

TEXAS

Morris Sheppard (1913).
Tom Connally (1929).

UTAH

Reed Smoot (1903).
William H. King (1917).

VERMONT

Frank L. Greene (1923).
Porter H. Dale (1923).

VIRGINIA

Claude A. Swanson (1910).
Carter Glass (1920).

WASHINGTON

Wesley L. Jones (1909).
C. C. Dill (1923).

WEST VIRGINIA

Henry D. Hatfield (1929).
Guy D. Goff (1925).

WISCONSIN

Robert M. La Follette, Jr. (1925).
John J. Blaine (1926).

WYOMING

(Vacant).
John B. Kendrick (1917).

MEMBERS OF THE HOUSE OF REPRESENTATIVES

Compiled from the Congressional Directory, Year 1929

Republicans in Roman; Democrats in *Italics;* Farmer-labor in ROMAN CAPS.
Dates show the beginning of service in the House.

ALABAMA

1. *John McDuffie* (1919).
2. *Lister Hill* (1923).
3. *Henry B. Steagall* (1915).
4. *Lamar Jeffers* (1921).
5. *La Fayette L. Patterson* (1928).
6. *William B. Oliver* (1915).
7. *Miles C. Allgood* (1923).
8. *Edward B, Almon* (1915).
9. *George Huddleston* (1915).
10. *William B. Bankhead* (1917).

ARIZONA

At large—*Lewis W. Douglas* (1927).

ARKANSAS

1. *William J. Driver* (1921).
2. *Pearl Peden Oldfield* (1929).
3. *Claude A. Fuller* (1929).
4. *Otis Wingo* (1913).
5. *Heartsill Ragon* (1923).
6. *D. D. Glover* (1929).
7. *Tilman B. Parks* (1921).

CALIFORNIA

1. *Clarence F. Lea* (1917).
2. Harry L. Englebright (1926).
3. Charles F. Curry (1913).
4. Florence P. Kahn (1925).
5. Richard J. Welch (1925).
6. Albert E. Carter (1925).
7. Henry E. Barbour (1919).
8. Arthur M. Free (1921).
9. W. E. Evans (1926).
10. Joe Crail (1927).
11. Philip D. Swing (1921).

COLORADO

1. William R. Eaton (1929).
2. Charles B. Timberlake (1915).
3. Guy U. Hardy (1919).
4. *Edward T. Taylor* (1909).

CONNECTICUT

1. E. Hart Fenn (1921).
2. Richard P. Freeman (1915).
3. John Q. Tilson (1915).
4. Schuyler Merritt (1917).
5. James P. Glynn (1925).

DELAWARE

At large—Robert G. Houston (1925).

FLORIDA

1. *Herbert J. Drane* (1917).
2. *R. A. Green* (1925).
3. *Thomas A. Yon* (1927).
4. *Ruth Bryan Owen* (1929).

GEORGIA

1. *Charles G. Edwards* (1925).
2. *E. E. Cox* (1925).
3. *Charles R. Crisp* (1913).
4. *William C. Wright* (1918).
5. *Robert Ramspeck* (1929).
6. *Samuel Rutherford* (1925).
7. *Malcolm C. Tarver* (1927).
8. *Charles H. Brand* (1917).
9. *Thomas M. Bell* (1905).
10. *Carl Vinson* (1914).
11. *William C. Lankford* (1919).
12. *William W. Larsen* (1917).

IDAHO

1. Burton L. French (1917).
2. Addison T. Smith (1913).

ILLINOIS

At large—Richard Yates (1919).
Ruth Hanna McCormick (1929).

1. Oscar De Priest (1929).
2. Morton D. Hull (1923).
3. Elliott W. Sproul (1921).
4. *Thomas A. Doyle* (1923).
5. *Adolph J. Sabath* (1907).
6. *James T. Igoe* (1926).
7. M. Alfred Michaelson (1921).
8. *Stanley H. Kunz* (1921).
9. Fred A. Birtten (1913).
10. Carl R. Chindblom (1919).
11. Frank R. Reid (1923).
12. John T. Buckbee (1926).
13. William R. Johnson (1925).
14. John C. Allen (1925).
15. (Vacant).
16. William (Ed) Hull (1923).
17. Homer W. Hall (1927).
18. William P. Holaday (1923).
19. Charles Adkins (1925).
20. *Henry T. Rainey* (1923).
21. Frank M. Raney (1929).
22. Ed. M. Irwin (1925).
23. *William W. Arnold* (1923).
24. (Vacant).
25. Edward E. Denison (1915).

INDIANA

1. Harry E. Rowbottom (1925).
2. *Arthur H. Greenwood* (1923).
3. James W. Dunbar (1929.
4. *Harry C. Canfield* (1923).
5. Noble J. Johnson (1925).
6. Richard N. Elliott (1917).
7. *Louis Ludlow* (1929).
8. Albert H. Vestal (1917).
9. Fred S. Purnell (1917).
10. William R. Wood (1915).
11. Albert R. Hall (1925).
12. David Hogg (1925).
13. Andrew J. Hickey (1919).

IOWA

1. William F. Kopp (1921).
2. F. D. Letts (1925).
3. T. J. B. Robinson (1923).
4. Gilbert N. Haugen (1899).
5. Cyrenus Cole (1921).
6. C. William Ramseyer (1915).
7. Cassius C. Dowell (1915).
8. Lloyd Thurston (1925).
9. Charles E. Swanson (1929).
10. L. J. Dickinson (1919).
11. Ed. H. Campbell (1929).

KANSAS

1. W. P. Lambertson (1929).
2. Ulysses S. Guyer (1926).
3. W. H. Sproul (1923).
4. Homer Hoch (1919).
5. James G. Strong (1919).
6. Chas. I. Sparks (1929).
7. Clifford R. Hope (1926).
8. *William A. Ayres* (1923).

KENTUCKY

1. *William V. Gregory* (1927).
2. *David H. Kincheloe* (1915).
3. *John W. Moore* (1925).
4. J. D. Craddock (1929).
5. Maurice H. Thatcher (1923).
6. J. Lincoln Newhall (1929).
7. Robert Blackburn (1929).
8. Lewis L. Walker (1929).
9. Elva R. Kendall (1929).
10. Katherine Langley (1927).
11. John M. Robsion (1919).

LOUISIANA

1. *James O'Connor* (1919).
2. *J. Zach Spearing* (1924).
3. *Numa F. Montet* (1929).
4. *John N. Sandlin* (1921).
5. *Riley J. Wilson* (1915).
6. *Bolivar E. Kemp* (1925).
7. *Rene L. DeRouen* (1927).
8. *James B. Aswell* (1913).

MAINE

1. Carroll L. Beedy (1921).
2. Wallace H. White, Jr. (1917).
3. John E. Nelson (1922).
4. Donald F. Snow (1929).

MARYLAND

1. *T. Alan Goldsborough* (1921).
2. Linwood L. Clark (1929).
3. *Vincent L. Palmisano* (1927).
4. *J. Charles Linthicum* (1911).
5. *Stephen W. Gambrill* (1924).
6. Frederick N. Zihlman (1917).

MASSACHUSETTS

1. Allen T. Treadway (1913).
2. William K. Kaynor (1929).
3. Frank H. Foss (1925).
4. George R. Stobbs (1925).
5. Edith Nourse Rogers (1925).
6. A. Piatt Andrew (1921).
7. *William P. Connery, Jr.* (1923).
8. Frederick W. Dallinger (1927).
9. Charles L. Underhill (1921).
10. *John J. Douglass* (1925).
11. George Holden Tinkham (1915).
12. *John W. McCormack* (1928).
13. Robert Luce (1919).
14. Richard B. Wigglesworth (1928).
15. Joseph W. Martin, Jr. (1925).
16. Charles L. Gifford (1922).

MICHIGAN

1. Robert H. Clancy (1927).
2. Earl C. Michener (1919).
3. Joseph L. Hooper (1925).
4. John C. Ketcham (1921).
5. Carl E. Mapes (1913).
6. Grant M. Hudson (1923).
7. Louis C. Cramton (1913).
8. Bird J. Vincent (1923).
9. James C. McLaughlin (1907).
10. Roy O. Woodruff (1921).
11. Frank P. Bohn (1926).
12. W. Frank James (1915).
13. Clarence J. McLeod (1923).

MINNESOTA

1. Victor Christgau (1929).
2. Frank Clague (1921).
3. August H. Andresen (1925).
4. Melvin J. Maas (1927).
5. William I. Nolan (1929).
6. Harold Knutson (1917).
7. O. J. KVALE (1923).
8. William A. Pittenger (1929).
9. Conrad G. Selvig (1926).
10. Godfrey G. Goodwin (1925).

MISSISSIPPI

1. *John E. Rankin* (1921).
2. *Wall Doxey* (1929).
3. *W. M. Whittington* (1925).
4. Jeff Busby (1923).
5. *Ross A. Collins* (1921).
6. *Robert S. Hall* (1929).
7. Percy E. Quin (1913).
8. James W. Collier (1909).

MISSOURI

1. M. A. Romjue (1923).
2. Ralph F. Lozier (1923).
3. Jacob L. Milligan (1923).
4. David Hopkins (1929).
5. Edgar C. Ellis (1929).
6. Thomas J. Halsey (1929).
7. John W. Palmer (1929).
8. *William L. Nelson* (1925).
9. *Clarence Cannon* (1923).
10. Henry F. Niedringhaus (1927).
11. *John J. Cochran* (1927).
12. Leonidas C. Dyer (1917).
13. Charles E. Kiefner (1929).
14. Dewey Short (1929).
15. Joe J. Manlove (1923).
16. Rowland L. Johnston (1929).

MONTANA

1. *John M. Evans* (1923).
2. Scott Leavitt (1923).

NEBRASKA

1. *John H. Morehead* (1923).
2. Willis G. Sears (1923).
3. *Edgar Howard* (1923).

4. Charles H. Sloan (1929).
5. Fred G. Johnson (1929).
6. Robert G. Simmons (1923).

NEVADA

At large—Samuel S. Arentz (1925).

NEW HAMPSHIRE

1. Fletcher Hale (1925).
2. Edward H. Wason (1915).

NEW JERSEY

1. Charles A. Wolverton (1926).
2. Isaac Bacharach (1915).
3. Harold G. Hoffman (1927).
4. Charles A. Eaton (1925).
5. Ernest R. Ackerman (1919).
6. Randolph Perkins (1921).
7. George N. Seger (1923).
8. Fred A. Hartley, Jr. (1929).
9. Franklin W. Fort (1925).
10. Frederick R. Lehlbach (1915).
11. *Oscar L. Aufder Heide* (1925).
12. *Mary T. Norton* (1925).

NEW MEXICO

At large—Albert Gallatin Simms (1929).

NEW YORK

1. Robert L. Bacon (1923).
2. *William F. Brunner* (1929).
3. *George W. Lindsay* (1923).
4. *Thomas H. Cullen* (1919).
5. *Loring M. Black, Jr.* (1923).
6. *Andrew L. Somers* (1925).
7. *John F. Quayle* (1923).
8. *Patrick J. Carley* (1927).
9. *David J. O'Connell* (1923).
10. *Emanuel Celler* (1923).
11. *Anning S. Prall* (1923).
12. *Samuel Dickstein* (1923).
13. *Christopher D. Sullivan* (1917).
14. *William I. Sirovich* (1927).
15. *John J. Boylan* (1923).
16. *John J. O'Connor* (1923).
17. Ruth Pratt (1929).
18. *John F. Carew* (1913).
19. *Sol Bloom* (1923).
20. *Fiorello H. LaGuardia* (1923).
21. *Joseph A. Gavagan* (1929).
22. *Anthony J. Griffin* (1917).
23. *Frank Oliver* (1923).
24. *James M. Fitzpatrick* (1926).
25. *J. Mayhew Wainwright* (1923).
26. Hamilton Fish, Jr. (1920).
27. Harcourt J. Pratt (1925).
28. *Parker Corning* (1923).
29. James S. Parker (1913).
30. Frank Crowther (1919).
31. Bertrand H. Snell (1915).
32. Francis D. Culkin (1928).
33. Frederick M. Davenport (1925).
34. John D. Clarke (1921).
35. Clarence E. Hancock (1927).
36. John Taber (1923).
37. Gale H. Stalker (1923).
38. James L. Whitley (1929).
39. Archie D. Sanders (1917).
40. S. Wallace Dempsey (1915).
41. Edmund F. Cooke (1929).
42. *James M. Mead* (1919).
43. Daniel A. Reed (1919).

NORTH CAROLINA

1. Lindsay C. Warren (1925).
2. John H. Kerr (1923).
3. Charles L. Abernethy (1922).
4. Edward W. Pou (1901).
5. Charles M. Stedman (1911).
6. *J. Bayard Clark* (1929).
7. *William C. Hammer* (1921).
8. *Robert L. Doughton* (1911).
9. Charles A. Jonas (1929).
10. George M. Pritchard (1929).

NORTH DAKOTA

1. Olger B. Burtness (1921).
2. Thomas Hall (1924).
3. James H. Sinclair (1919).

OHIO

1. Nicholas Longworth (1915).
2. William E. Hess (1929).
3. Roy G. Fitzgerald (1921).
4. John L. Cable (1929).
5. Charles J. Thompson (1919).
6. Charles C. Kearns (1915).
7. Charles Brand (1923).
8. Grant E. Mouser, Jr. (1929).
9. W. W. Chalmers (1925).
10. Thomas A. Jenkins (1925).
11. *Mell G. Underwood* (1923).
12. John C. Speaks (1921).
13. Joe E. Baird (1929).
14. Francis Seiberling (1929).
15. C. Ellis Moore (1919).
16. C. B. McClintock (1929).
17. W. M. Morgan (1921).
18. Frank Murphy (1919).
19. John G. Cooper (1915).
20. *Charles A. Mooney* (1923).
21. *Robert Crosser* (1923).
22. Chester B. Bolton (1929).

OKLAHOMA

1. Charles O'Connor (1929).
2. *William W. Hastings* (1923).
3. *Wilburn Cartwright* (1927).
4. *Tom D. McKeown* (1923).
5. U. S. Stone (1929).
6. *Jed Johnson* (1926).
7. *James V. McClintic* (1915).
8. M. C. Garber (1923).

OREGON

1. Willis C. Hawley (1907).
2. Robert R. Butler (1928).
3. Franklin F. Korell (1927).

PENNSYLVANIA

1. James M. Beck (1927).
2. George S. Graham (1913).
3. Harry C. Ransley (1920).
4. Benjamin M. Golder (1925).
5. James J. Connolly (1921).
6. George A. Welsh (1923).
7. George P. Darrow (1915).
8. James Wolfenden (1928).
9. Henry W. Watson (1915).
10. W. W. Griest (1909).
11. Laurence H. Watres (1923).
12. C. Murra Turpin (1929).
13. George F. Brumm (1929).
14. Charles J. Esterly(1929).
15. Louis T. McFadden (1915).
16. Edgar R. Kiess (1913).
17. Frederick W. Magrady (1925).
18. Edward M. Beers (1923).
19. Isaac H. Doutrich (1926).
20. J. Russell Leech (1927).
21. J. Banks Kurtz (1923).
22. Franklin Menges (1925).
23. J. Mitchell Chase (1927).
24. Samuel A. Kendall (1919).
25. Henry W. Temple (1915).
26. J. Howard Swick (1927).
27. Nathan L. Strong (1917).
28. Thomas C. Cochran (1926).
29. Milton W. Shreve (1919).
30. William R. Coyle (1929).
31. Adam M. Wyant (1921).
32. Stephen G. Porter (1911).
33. Clyde Kelly (1917).
34. Patrick J. Sullivan (1929).
35. Harry A. Estep (1927).
36. Guy E. Campbell (1917).

RHODE ISLAND

1. Clark Burdick (1919).
2. Richard S. Aldrich (1923).
3. *Jeremiah E. O'Connell* (1929).

SOUTH CAROLINA

1. *Thomas S. McMillan* (1925).
2. *Butler B. Hare* (1925).
3. *Fred H. Dominick* (1917).
4. *John J. McSwain* (1921).
5. *William F. Stevenson* (1917).
6. *Allard H. Gasque* (1928).
7. *Hampton P. Fulmer* (1921).

SOUTH DAKOTA

1. Charles A. Christopherson (1919).
2. Royal C. Johnson (1915).
3. William Williamson (1921).

TENNESSEE

1. B. Carroll Reece (1921).
2. J. Will Taylor (1919).
3. *S. D. McReynolds* (1923).
4. *Cordell Hull* (1923).
5. *Ewin L. Davis* (1919).
6. *Joseph W. Byrns* (1909).
7. *Edward E. Eslick* (1925).
8. *Gordon Browning* (1923).
9. Jere Cooper (1929).
10. Hubert F. Fisher (1917).

TEXAS

1. *Wright Patman* (1929).
2. *John C. Box* (1919).
3. *Morgan G. Sanders* (1921).
4. *Sam Rayburn* (1913).
5. *Hatton W. Sumners* (1913).
6. *Luther A. Johnson* (1923).
7. *Clay Stone Briggs* (1919).
8. *Daniel E. Garrett* (1921).
9. *Joseph J. Mansfield* (1917).
10. *James P. Buchanan* (1913).
11. *O. H. Cross* (1929).
12. *Fritz G. Lanham* (1919).
13. *Guinn Williams* (1923).
14. Augustus McCloskey (1929).
15. *John N. Garner* (1903).
16. *C. B. Hudspeth* (1919).
17. *R. Q. Lee* (1929).
18. *Marvin Jones* (1917).

UTAH

1. Don B. Colton (1921).
2. Elmer O. Leatherwood (1921).

VERMONT

1. Elbert S. Brigham (1925).
2. Ernest W. Gibson (1923).

VIRGINIA

1. *Schuyler Otis Bland* (1918).
2. Menalcus Lankford (1929).
3. *Andrew J. Montague* (1913).
4. *Patrick H. Drewry* (1920).
5. *Joseph Whitehead* (1925).
6. *Clifton A. Woodrum* (1923).
7. J. A. Garber (1929).
8. *R. Walton Moore* (1919).
9. Joseph C. Shaffer (1929).
10. *Henry St. George Tucker* (1923).

WASHINGTON

1. John F. Miller (1917).
2. Lindley H. Hadley (1915).
3. Albert Johnson (1913).
4. John W. Summers (1919).
5. *Samuel B. Hill* (1923).

WEST VIRGINIA

1. Carl G. Bachman (1925).
2. Frank L. Bowman (1925).
3. John M. Wolverton (1929).
4. James A. Hughes (1927).
5. Hugh Ike Shott (1929).
6. *Joel L. Smith* (1929).

WISCONSIN

1. Henry Allen Cooper (1921).
2. Charles A. Kading (1927).
3. John M. Nelson (1921).
4. John C. Schafer (1923).
5. William H. Stafford (1929).
6. Florian Lampert (1918).
7. J. D. Beck (1921).
8. Edward E. Browne (1913).
9. George J. Schneider (1923).
10. James A. Frear (1913).
11. Hubert H. Peavey (1923).

WYOMING

At large—Vincent Carter (1929).

ALASKA

Dan A. Sutherland (1921).

HAWAII

Victor S. K. Houston (1927).

PHILIPPINES

Pedro Guevara (1923).
Camilo Osias (1929).

PORTO RICO

Felix Cordova Davila (1917).

PERSONNEL OF THE ADMINISTRATION

By Milton Conover

Professor, Yale University

COMPOSITION OF THE CABINET

Organization. — When President Hoover entered upon the Presidency on March 4, 1929, it was thought that his Cabinet might be regarded as one selected without geographical considerations being in control. Two of President Coolidge's Secretaries—Mellon and Davis, both of Pittsburgh—were continued by President Hoover, and Secretary of State Stimson had been Secretary of War in President Taft's Cabinet. The other appointees added no new states to the list of those that previously had been represented in the Cabinet. It happened, also, that with two exceptions, all of the Secretaries were appointed from metropolitan areas. Thus, for Secretary of State, Henry Lewis Stimson of New York City; Treasurer, Andrew W. Mellon of Pittsburgh; Justice, William De Witt Mitchell of St. Paul; Post Office, Walter F. Brown of Toledo; Navy, Charles Francis Adams of Quincy, Mass.; Interior, Ray Lyman Wilbur, Palo Alto, Calif.; Agriculture, Arthur Mastick Hyde of Trenton, Mo.; Commerce, Robert Patterson Lamont of Chicago; Labor, James John Davis of Pittsburgh. This selection from eight of the most popular states—each of which had contributed several of the 309 members of previous Cabinets—still leaves eleven states that have never produced a cabinet secretary: Rhode Island and Florida of the East; Oklahoma of the Southwest; and the Trans-Mississippi Inland block consisting of North and South Dakota, Montana, Idaho, Wyoming, Utah, Nevada, and Arizona.

Ages of Cabinet Members.—In years, all but three of the Cabinet were senior to the President, Mr. Mellon being the eldest of the elder statesmen at the age of 74. Secretary Adams ranked second at 63; Messrs. Stimson and Lamont nearly touching them at 62; and Mr. Brown at 60. The remaining four were in their fifties; Secretary Davis being 56; and Mr. Mitchell being of the President's age, 55; while Messrs. Wilbur at 54 and Hyde at 52 were the President's juniors.

College Representation in Cabinet.—All of President Hoover's Cabinet were College bred except Mr. Davis, and all of these Collegians were graduates with baccalaureate degrees *in cursu* excepting Mr. Mellon who studied for a time at the Western University of Pennsylvania, which is now known as the University of Pittsburgh. Secretary of State Stimson holds the A. B. at Yale, and the M. A. at Harvard, and he has studied at Harvard Law School. Attorney-General Mitchell studied at Yale two years and later took both the A. B. and the LL.B. at the University of Minnesota. Postmaster-General Brown achieved the A. B. at Harvard and continued study at the Harvard Law School. Secretary Adams won both the A. B. *cum laude* and the LL.B. at Harvard. Mr. Wilbur accomplished the A. B. and the A. M. at Stanford and the M. D. at Cooper Medical College. He studied, also, at the University of London, England, and at the University of Munich, Germany, he being the only Cabinet member who has studied in Europe or who holds a doctor's degree *in cursu*. Secretary of Agriculture Hyde acquired the A. B. at Michigan and the LL.B at the State University of Iowa; Secretary of Commerce Lamont graduated at Michigan with the Bachelor of Science degree in civil engineering.

Professional Callings.—The professional calling of six of the Cabinet Elders was the law: Messrs. Stimson, Good, Mitchell, Brown, Adams, and Hyde. Mr. Mellon is a bank president and Mr. Wilbur was a university president, being the head of Stanford—the President's own university. Secretary Lamont is an engineer and manufacturer, while Mr. Davis has been a public servant and a labor organizer.

Political Aspects of Appointments.—Just as geographical considerations apparently were subordinated to personal qualifications in the final appointment of President Hoover's Cabinet, so, in a measure, at least, were political party considerations,—unless there was an attempt to procure advisors of varying viewpoints. For his counsellors may be classified into three categories: Conservative, Progressive, Democratic. Representative of the Conservatives is Mr. Stimson who had served in President Taft's Cabinet at the time of the Progressive movement. Mr. Brown, in 1912-1913, was chairman of the Progressive Party State Central Committee of Ohio, and a member of the Progressive Party National Executive Committee. Mr. Mitchell had been known as a Democrat and was so represented in the *Who's Who in America* for 1928-1929.

Public Service of Cabinet Members.—All of the appointees have had previous experience in public life excepting Mr. Lamont, who like about 25 of his 309 predecessors of the Cabinet, seems to be classified with those who "never before held public office" as was Mr. Mellon when he entered President Harding's Cabinet in 1921. County government had afforded elementary political education for Secretary Davis who had been County Recorder of Madison County, Indiana, in the early days of his political career. City politics, however, had been a more popular school of public affairs for the majority of the Cabinet. In this field, Mr. Davis had been trained as City Clerk of Elwood, Indiana. Mr. Mitchell was Secretary of the first Charter Commission of St. Paul. Mr. Hyde had been Mayor of Princeton, Missouri; and Mr. Adams had been a member of the City Council, and the Mayor of Quincy, Massachusetts.

POLITICAL EXPERIENCE OF CABINET MEMBERS

In state politics, four of the Cabinet had had experience. Mr. Wilbur once served as State Park Commissioner of California. Postmaster-General Brown was once a member of the State Constitutional Convention of Ohio. Secretary Stimson was once a member of a similar convention in New York and he had been a candidate for governor of New York; and, Mr. Hyde had been Governor of Missouri.

National politics had been entered by four of the 1929 Cabinet; Mr. Stimson had been Secretary of War in 1911-13, as well as Governor-General of the Philippines at the time of his call to the Secretaryship of State. Attorney-General Mitchell had been solicitor-general of the United States and Regional Counsel of the United States Railroad Administration. Postmaster-General Brown had been Assistant Secretary of Commerce, and Chairman of the Congressional Joint Committee on Reorganization, representing President Harding. Three hundred and nine former cabinet members approximately one-third had served in the House of Representatives and one-fourth in the Senate. Likewise about one-third had served in state legislatures.

The political antecedents of President Hoover's Cabinet, therefore, might suggest that a premium had been placed upon administrative ability rather than upon legislative experience,—that there had been recognized a clear separation of powers and division of labor between administration and politics.

WAR EXPERIENCE OF CABINET MEMBERS

In time of war, three of President Hoover's counsellors had taken up arms. Attorney-General Mitchell was a Lieutenant and Acting Judge Advocate during the Spanish-American War, and like Mr. Lamont, he was a Colonel during the World War. Mr. Stimson, who had been Secretary of War under President Taft, served successively as Major, Lieutenant-Colonel and Colonel under President Wilson. With the American Expeditionary Force in France he was in active service nearly a year, eventually becoming Colonel of the 31st Field Artillery.

RELIGIOUS AND FRATERNAL AFFILIATIONS

The religious affiliation of two of the Cabinet members is Presbyterian:—Messrs. Stimson and Mitchell. Mr. Hyde is a Methodist. Neither the *Congressional Directory* nor *Who's Who in America* seems to record the ecclesiastical claims of other Secretaries.

Lodge and fraternal loyalties are acknowledged by five of the Secretaries, the Masonic Lodge including Messrs. Davis and Hyde, the two being Masons of the 32nd degree. Messrs. Hyde and Davis are also members of the Independent Order of Odd Fellows. Mr. Davis, furthermore, is an Elk, a Moose, and a Knight of Pythias. Mr. Wilbur is a member of the College Greek Letter scholarship honor Society of Phi Beta Kappa and of the scientific honor society of Sigma Xi. Mr. Stimson is a member of the social fraternity of Psi Upsilon and of the Yale Senior Society, Skull and Bones.

CLUB MEMBERSHIP

Club membership seems to possess a strong appeal to President Hoover's Cabinet, all of the Secretaries being members of from four to seven different Clubs excepting Mr. Mellon, who apparently is content with one membership, and Secretary Hyde, who apparently has joined no Club but still maintains lodge connections. Some of the Clubs are local, and since Messrs. Mellon and Davis are the only two Secretaries who live in the same city when not in Washington, the list of Clubs represented in the Cabinet is an extensive one: American Republican, Athletic, Bohemian, Burning Tree, Century, Chevy Chase, Columbus, Commerce, Commonwealth, Congressional, Cosmos, Country, Down Town, Duquesne, Eastern Yacht, Harvard of New York, Metropolitan, Minnesota, Old Elm, Onwentsia, Press, Quincy Yacht, Shore Acres, Somerset, Toledo Yacht, University, Union League, Pacific Union, etc.

DOMESTIC LIFE

This club life apparently has not restricted corresponding domestic life, for all of Mr. Hoover's Cabinet members are married and all but three of them are parents. Mr. Mellon's son is a student at Cambridge University, England; and his daughter married

Vice-Consul D. K. E. Bruce, the son of the Democratic Senator from Maryland. Secretary Mitchell has two sons. Mr. Wilbur has three sons and two daughters; Mr. Lamont, one son and likewise two daughters; Mr. Hyde has one daughter, while Mr. Davis has one son James, and four daughters—Jane, Jean, Joan and Jewell. Thus, the American Government still rests on the home, and the Cabinet is its exemplar.

FEDERAL ADMINISTRATIVE ORGANIZATION

By William M. Schuyler

Associate Editor, The American Year Book

THE PRESIDENT AND VICE-PRESIDENT

President.—Herbert Hoover, of California (Republican). Sworn into office as President of the United State, March 4th, 1929, in succession to President Coolidge.

Vice-President.—Charles Curtiss, of Kansas (Republican). Inaugurated Vice-President of the United States, March 4th, 1929.

Secretaries to the President.—George Akerson (Minnesota); Lawrence Richey (Pennsylvania); Walter Hughes Newton (Minnesota).

Vacancy.—By Act of Congress, in the case of vacancy occurring in the office of President through the death or removal of both the President and Vice-President, the Cabinet officers succeed to the presidency in the order indicated in the arrangement of the following summary of the executive departments:

DEPARTMENT OF STATE

Secretary of State.—Henry Lewis Stimson.

Under-Secretary of State.—Joseph P. Cotton.

Assistant Secretaries of State.—Wilbur J. Carr.—William R. Castle, —Francis White.—Nelson T. Johnson.

Foreign Service Personnel Board.—Wilbur J. Carr, Assistant Secretary of State, chairman.—William R. Castle, Jr., Assistant Secretary of State.—Nelson T. Johnson, Assistant Secretary of State.

Solicitor.—Green H. Hackworth.

Economic Adviser.—Frederick Livesey (Acting).

Chief Clerk and Administrative Assistant.—E. J. Ayers.

Assistant to the Secretary of State.—William H. Beck.

Chiefs of Divisions:

- Far Eastern Affairs.—Stanley K. Hornbeck.
- Latin-American Affairs.—Dana G. Monroe.
- Western European Affairs.—J. Theodore Marriner.
- Near Eastern Affairs.—Wallace S. Murray.
- Mexican Affairs.—Arthur Bliss Lane.
- Eastern European Affairs.—Robert F. Kelley.
- Passport.—Ruth B. Shipley.
- Current Information.—Michael J. McDermott.
- Foreign Service Administration.—Herbert C. Hengstler.
- International Conferences and Protocol.—James Clement Dunn.
- Treaty.—Charles M. Barnes.
- Foreign Service Personnel.—Worthington E. Stewart.

Chiefs of Bureaus:

- Accounts.—William McNeir.
- Indexes and Archives.—David A. Salmon.
- Translating.—Emerson B. Christie.

Chiefs of Offices:

- Consular Commercial.—John G. Erhardt (Acting).
- Historical Advisor.—Tyler Dennett.
- Coördination and Review.—Margaret M. Hanna.
- Visa.—John F. Simmons.
- Foreign Service Buildings.—Keith Merrill.

Editor of Laws of Congress.—Henry L. Bryan.

Disbursing Officer.—William F. Cramer.

DEPARTMENT OF THE TREASURY

Secretary of the Treasury.—Andrew W. Mellon.

Charged with the management of the national finances. He prepares plans for the improvement of the revenue and support of the public credit; superintends collection of the moneys paid from and into the Treasury; controls construction of public buildings, coinage and printing of money, and the administration of the Coast Guard and the Public Health Service; ex-officio chairman of the Federal Reserve Board and of the Federal Farm Loan Board.

Under-Secretary of the Treasury.—Ogden L. Mills.

Assistant Secretaries of the Treasury.—Ferry K. Heath (in charge of public buildings and miscellaneous); Seymour Lowman (in charge of customs, coast guard and in charge of prohibition); Walter Hope.

Commissioner of the Public Debt.—William S. Broughton.

Deputy Commissioner of the Public Debt.—Rene W. Barr.

Assistant Commissioner of the Public Debt.—S. R. Jacobs.

Register of the Treasury.—E. E. Jones.

Commissioner of Accounts and Deposits.—Robert G. Hand.

Deputy Commissioner of Accounts and Deposits.—Daniel W. Bell.

Division of Deposits.—Edward D. Batchelder, Chief.

Assistant to the Secretary of the Treasury.—John Kieley.

Chiefs of Divisions:

Appointments.—James E. Harper.
Bookkeeping and Warrants.—E. F. Bartelt.
Customs.—F. X. A. Eble.
Loans and Currency.—C. N. McGroarty.
Paper Custody.—M. A. Emerson.
Public Debt Accounts and Auditor.—M. R. Loafman.
Secret Service.—W. H. Moran.
Disbursing Clerk.—J. L. Summers.
Government Actuary.—Joseph S. McCoy.

Comptroller of the Currency.—J. W. Pole.

Has supervision of the national banks, their examination and reports; the preparation and issue of national bank circulation; the redemption and destruction of national bank notes. Ex-officio a member of the Federal Reserve Board; and in this capacity draws a salary of $7000 in addition to his salary of $5000 attached to the office proper of Comptroller of the Currency.

Treasurer of the United States.—W. O. Woods.

Charged with the receipt and disbursement of all public moneys deposited in the Treasury and subtreasuries and in national bank depositories.

National Bank Redemption Agency.—Michael E. Slindee, Superintendent.

Director of the Bureau of the Budget.—Colonel J. Clawson Roop.

Commissioner of Internal Revenue.—Robert H. Lucas.

Charged with general supervision of the collection of all internal revenue taxes, including the income tax, and the enforcement of internal revenue laws.

Commissioner of Prohibition.—James M. Doran.

Director of the Mint.—Robert J. Grant.

Has general supervision of the mints and assay offices.

Federal Farm Loan Bureau.—Andrew W. Mellon, Secretary of the Treasury, Chairman (ex-officio); Paul Bestor, Farm Loan Commissioner; John H. Guill, Lewis J. Pettijohn, Albert C. Williams, George R. Cooksley, Floyd R. Harrison.

Bureau of Engraving and Printing.—Director, Alvin W. Hall.

Produces all the securities and similar work of the Government printed from steel plates.

Bureau of the Public Health Service.—Hugh S. Cumming, Surgeon General.

Charged with the framing and enforcement of regulations for the prevention of the introduction and spread of contagious disease; supervision in the quarantine service of the United States, and supervision of the marine hospitals.

The Coast Guard.—Rear Admiral Frederick C. Billard, Commandant.

Office of the Supervising Architect.—James A. Wetmore, Acting Supervising Architect.

Custom House.—Charles R. Lewis, Deputy Collector in Charge.

DEPARTMENT OF WAR

Secretary of War.—Patrick J. Hurley.

The Assistant Secretary of War.—Vacant.

Assistant Secretary of War.—F. Trubee Davison.

Assistant and Chief Clerk.—John C. Scofield.

Executive Assistant to Secretary of War.—John W. Martyn.

Clerk to the Secretary.—John W. Schott.

Assistant Chief Clerk.—John B. Randolph.

Disbursing Clerk.—Edwin M. Lawton.

Principal Clerk.—Frank M. Hoadley.

War Department General Staff.—General Charles P. Summerall, Chief of Staff; Major General Briant H. Wells, Deputy Chief of Staff.

Office of the Chief of Cavalry.—Major General Herbert B. Crosby, Chief.

Office of the Chief of Field Artillery.—Major General Fred T. Austin, Chief.

Office of the Chief of Coast Artillery.—Maj. Gen. Andrew Hero, Jr., Chief.

Office of the Chief of Infantry.—Major-General Stephen O. Fuqua, Chief.

Office of the Adjutant General.—Maj. Gen. Charles H. Bridges, the Adjutant General.

The Inspector General's Office.—Maj. Gen. W. C. Rivers, Inspector General.

Office of the Judge Advocate General.—Maj. Gen. E. A. Kreger, Judge Advocate General.

Office of the Quartermaster General.—Maj. Gen. B. F. Cheatham, Quartermaster General.

Office of the Chief of Finance.—Maj. Gen. Roderick L. Carmichael, Chief of Finance.

Office of the Surgeon General.—Maj. Gen. M. W. Ireland, Surgeon General.

Office of the Chief of Engineers.—Maj. Gen. Lytle Brown, Chief of Engineers.

Office of the Chief of Ordnance.—Maj. Gen. Clarence C. Williams, Chief.

Office of the Chief Signal Officer.—Maj. Gen. George S. Gibbs, Chief.

Office of the Chief of the Air Corps.—Maj. Gen. J. E. Fecht, Chief.

Bureau of Insular Affairs.—Brig. Gen. Francis LeJau Parker, Chief.

Philippine Government.—Dwight F. Davis, Governor General.

Porto Rico Government.—Theodore Roosevelt, Governor.

Militia Bureau.—Maj. Gen. William G. Everson, Chief.

Office of the Chief of the Chemical Warfare Service.—Maj. Gen. Harry L. Gilchrist, Chief.

The Army War College.—Maj. Gen. William D. Connor, Commandant.

DEPARTMENT OF JUSTICE

Attorney General.—William DeWitt Mitchell.

Represents the United States in all legal matters.

Solicitor General.—Charles Evans Hughes, Jr.

Special Assistant to the Attorney General.—Paul A. Chase.

Assistant to the Attorney General.—John Lord O'Brian.

Assistant Attorneys General.—Herman J. Galloway, Oscar R. Luhring, George R. Farnum, Seth W. Richardson, Charles F. Sisson, G. Aaron Youngquist.

Assistant Attorney General, Division of Customs.—Charles D. Lawrence.

Director Bureau of Investigation.—J. Edgar Hoover.

Private Secretary and Assistant to the Attorney General.—Ugo J. A. Carusi.

Chief Clerk and Administrative Assistant.—James W. Baldwin.

Assistant Chief Clerk and Appointment Clerk.—Charles B. Sornbroger.

Division of Mails and Files.—Arthur Robb, Chief.

Division of Supplies and Printing.—Edward N. Bodholdt, Chief.

Librarian.—George Kearney.

Superintendent of Prisons.—Sanford Bates.

Attorney in Charge of Pardons.—James A. Finch.

General Agent.—John W. Gardner.

Assistant General Agent.—H. J. McClure.

Disbursing Clerk.—Raymond D. Allison.

POST OFFICE DEPARTMENT

Postmaster General.—Walter F. Brown.

Secretary to the Postmaster General.—Kenneth Macpherson.

First Assistant Postmaster General.—Arch Coleman.

Second Assistant Postmaster General.—Warren Irving Glover.

Third Assistant Postmaster General.—Frederic A. Tilton.

Fourth Assistant Postmaster General.—John W. Philp.

Office of the Comptroller.—William E. Buffington, Comptroller.

Assistant and Chief Clerk.—Terence H. Sweeney.

Expert Accountant.—Lewis M. Bartlett.

Office of Solicitor:
Horace J. Donnelly, Solicitor.
Walter E. Kelly, Assistant Solicitor.
Assistant Attorneys.—Calvin W. Hassell, Harold F. Jones, William L. Rhoads, Stewart E. Blassingham, Abraham B. Keefer, William C. O'Brien, John J. Gregory, George H. Schoolmeesters, Louis L. Korn.

Division of Post Office Inspectors: Chief Inspector.—vacant; Assistant Chief Inspector.—Thomas M. Milligan; Superintendent.—Roscoe E. Mague.

DEPARTMENT OF AGRICULTURE

Secretary of Agriculture.—Arthur Mastick Hyde.

Exercises supervision over agricultural industry, experiment stations, quarantine stations for imported cattle, inspection of foods and drugs, national forest reserves, and interstate game laws.

Assistant Secretary.—R. W. Dunlap.

Assistant to the Secretary.—E. N. Meader.

Director of Scientific Work.—A. F. Woods.

Director of Regulatory Work.—Walter G. Campbell.

Director of Extension Work.—C. W. Warburton.

Director of Personnel and Business Administration.—W. W. Stockberger.

Director of Information.—M. S. Eisenhower.

Solicitor.—C. E. Winters.

Librarian.—Claribel R. Barnett.

Office of Experiment Stations.—Chief, vacant.

Weather Bureau.—Charles F. Marvin, Chief.

Bureau of Animal Industry.—John R. Mohler, Chief.

Bureau of Dairy Industry.—O. E. Reed, Chief.

Bureau of Plant Industry.—William A. Taylor, Chief.

Forest Service.—R. Y. Stuart, Forester and Chief.

Bureau of Chemistry and Soils.—Henry G. Knight, Chief.

Bureau of Entomology.—C. L. Marlatt, Chief.

Bureau of Biological Survey.—Paul G. Redington, Chief.

Bureau of Public Roads.—Thomas H. MacDonald.

Bureau of Agricultural Economics.—Nils A. Olsen, Chief.

Bureau of Home Economics.—Louise Stanley, Chief.

Plant Quarantine and Control Administration.—C. L. Marlatt, Chief.

Grain Futures Administration.—J. W. T. Duvel, Chief.

Food, Drug and Insecticide Administration.—W. G. Campbell, in charge.

DEPARTMENT OF COMMERCE

Secretary of Commerce.—Robert Patterson Lamont.

Charged with promoting commerce, mining, manufacturing, shipping, fisheries, patents, and transportation.

Assistant Secretary.—Julius Klein.

Assistant Secretary for Aeronautics.—Clarence M. Young.

Solicitor.—Ephraim F. Morgan.

Administrative Assistant to the Secretary.—Malcolm Kerlin.

Private Secretary to the Secretary.—Arthur W. Coombs.

Chief Clerk and Superintendent.—E. W. Libbey.

Disbursing Clerk.—Charles E. Molster.

Chiefs of Divisions:
- Appointments.—Edw. J. Gardner.
- Publications.—Thomas F. McKeon.
- Supplies.—Walter S. Erwin.

Librarian.—Anne G. Cross.

Aeronautics Branch.—Director, vacant.

Assistant Director.—G. G. Budwig.

Radio Division.—William D. Terrell, Chief.

Bureau of the Census.—William M. Steuart, Director.

Bureau of Foreign and Domestic Commerce.—William L. Cooper, Director.

Bureau of Standards.—George K. Burgess, Director.

Bureau of Fisheries.—Henry O'Malley, Commissioner.

Bureau of Lighthouses.—George R. Putnam, Commissioner.

Coast and Geodetic Survey.—R. S. Patton, Director.

Bureau of Navigation.—Arthur J. Tyrer, Commissioner.

Steamboat Inspection Service.—Dickerson N. Hoover, Supervising Inspector General.

Patent Office.—Thomas E. Robertson.

Bureau of Mines.—Scott Turner.

DEPARTMENT OF LABOR

Secretary of Labor.—James John Davis.

Charged with the duty of fostering, promoting and developing the welfare of the wage earners of the United States and also working towards a solution of the labor problem.

Assistant Secretary of Labor.—Robe Carl White.

Private Secretary to the Secretary of Labor.—John T. Meikle.

Assistants to the Secretary of Labor.—Peter F. Snyder, W. N. Smelser.

Solicitor.—Theodore G. Risley.

Office of the Chief Clerk.—Chief Clerk.—Samuel J. Gompers.

Disbursing Clerk.—John R. Demorest.

Chief, Division of Publications and Supplies.—Shelby Smith.

Appointment Clerk.—Robert C. Starr.

Librarian.—Laura A. Thompson.

Bureau of Labor Statistics.—Ethelbert Stewart, Commissioner.

Bureau of Immigration.—Harry E. Hull, Commissioner General.

Children's Bureau.—Grace Abbott, Chief.

Bureau of Naturalization.—Raymond F. Crist, Commissioner.

Women's Bureau.—Mary Anderson, Director.

United States Employment Service.—Francis I. Jones, Director.

Bureau of Industrial Housing and Transportation.—Nulah T. Andrews, Director.

DEPARTMENT OF THE NAVY

Secretary of the Navy.—Charles Francis Adams.

The Assistant Secretary of the Navy.—Ernest D. Jahncke.

Assistant Secretary of the Navy (Air).—David S. Ingalls.

Chief Clerk.—F. S. Curtis.

Private Secretary to the Secretary.—Alexander J. Doyle.

Private Secretary to the Assistant Secretary of the Navy.—Verne Simkins.

Private Secretary to the Assistant Secretary of the Navy (Air).—Elizabeth C. Burrows.

Chief of Appointment Division.—William D. Bergman.

Budget Clerk and Assistant Chief Clerk.—Roy H. Moses.

Disbursing Clerk.—A. H. Hoiland.

Chief of Division of Records.—Charles T. Ogle.

Island Governments:
- Guam.—Commander Willis W. Bradley, Jr., Governor.
- American Samoa.—Capt. Gatewood S. Lincoln, Governor.
- Virgin Islands.—Capt. Waldo Evans (Retired), Governor.

Office of Naval Operations.—Admiral Charles F. Hughes, Chief.

Bureau of Navigation.—Rear Admiral Richard H. Leigh, Chief.

Bureau of Yards and Docks.—Rear Admiral L. E. Gregory, Chief.

Bureau of Ordnance.—Rear Admiral William D. Leahy, Chief.

Bureau of Construction and Repair.—Rear Admiral J. D. Beuret, Chief.

Bureau of Engineering.—Rear Admiral Harry E. Yarnell, Engineer-in-Chief.

Bureau of Supplies and Accounts.—Rear Admiral Joseph Johnston Cheatham, Chief.

Bureau of Medicine and Surgery.—Rear Admiral Charles E. Riggs, Chief.

Bureau of Aeronautics.—Rear Admiral William A. Moffett, Chief.

Office of the Judge Advocate General of the Navy.—Rear Admiral David F. Sellers, Judge Advocate General.

Naval Consulting Board.—Thomas A. Edison, President.

Compensation Board.—Rear Admiral W. L. Capps (Retired), Senior Member.

General Board.—Admiral Charles F. Hughes, Admirals A. T. Long, Mark L. Bristol, Richard H. Jackson, J. V. Chase, Maj. Gen. W. C. Neville, Rear Admirals H. H. Hough, George C. Day, J. R. P. Pringle, J. M. Reeves, Captains A. W. Johnson, W. R. Gherardi, Lieut. Col. L. C. Lucas, Commander Harold C. Train, Lieutenant Commander E. M. Williams.

Board of Medical Examiners.—Rear Admiral A. M. D. McCormick, President.

Naval Examining Board.—Rear Admiral Yates Sterling, Jr., President.

Naval Retiring Board.—Rear Admiral A. M. D. McCormick, President.

Naval Dispensary.—Capt. Charles M. Oman.

Navy Yard and Station, Washington, D. C.—Rear Admiral A. L. Willard, Commandant and Superintendent Naval Gun Factory.

Naval Medical School.—Captain Charles S. Butler.

Naval Hospital.—Capt. Theodore W. Richards.

Attendance on Officers.—Commander John J. O'Malley.

Board for Examination of Medical Officers.—Capt. Charles S. Butler, President.

Board for Examination of Dental Officers.—Capt. Charles F. Butler, President.

Headquarters Marine Corps.—Maj. Gen. Wendell C. Neville, Commandant; Brig. Gen. Rufus H. Lane, Adjutant and Inspector; Brig. Gen. Cyrus S. Radford, Quartermaster; Brigadier General George Richards, Paymaster.

Marine Barracks.—Colonel Rush R. Wallace, Commanding.

DEPARTMENT OF THE INTERIOR

Secretary of the Interior.—Ray Lyman Wilbur.

Charged with pensions, public lands, Indian affairs, geological surveys, reclamation of arid lands, and mines.

First Assistant Secretary.—Joseph M. Dixon.

Assistant Secretary.—John H. Edwards.

Administrative Assistant.—Ebert K. Burlew.

Chief Clerk.—W. Bertrand Acker.

Solicitor.—Edward C. Finney.

Assistant to the Solicitor.—Orlin H. Graves.

Board of Appeals.—George B. Gardner, William B. Newman, Alvah W. Patterson.

Supervisor of Classification.—John Harvey.

Chiefs of Divisions:
- Disbursing.—J. B. Callahan.
- Appointments, Mails and Files.—Mrs. J. Atwood Maulding.
- Publications.—Charles F. Glass.
- Supplies.—Amos W. Hawk.
- Traffic.—Charles E. Harris.
- Medical Officer.—Charles E. O'Connor.

General Land Office.—Charles C. Moore.

Bureau of Indian Affairs.—Charles J. Rhoads, Commissioner.

Bureau of Pensions.—Earl D. Church, Commissioner.

Office of Education.—William John Cooper, Commissioner.

Geological Survey.—George Otis Smith, Director.

Bureau of Reclamation.—Elwood Mead, Commissioner.

National Park Service.—Horace M. Albright, Director.

Board of Indian Commissioners.—Samuel A. Eliot, Chairman.

St. Elizabeth's Hospital.—William A. White, M.D., Superintendent.

Freedmen's Hospital.—William A. Warfield, M.D., Surgeon-in-Chief.

Howard University.—Ray Lyman Wilbur, Secretary of the Interior, patron *ex-officio;* Charles H. Sherburne, President, Board of Trustees; Mordecai W. Johnson, President.

Southern Appalachian National Park Commission.—Henry W. Temple, Chairman.

Territorial Officials:

Governor of Alaska.—George A. Parks.

Governor of Hawaii.—Lawrence M. Judd.

The Alaska Railroad.—Otto F. Ohlson, General Manager.

MISCELLANEOUS EXECUTIVE SERVICES

Smithsonian Institution.—Established 1846, under the terms of James Smithson's will, for the "increase and diffusion of knowledge among men." The former aim is accomplished by the promoting of original, scientific research, and the latter by publication and lectures. The affairs of the Institution are managed by a Board of Regents. This board coöperates not only with the Government but also with National scientific bodies.

Under the direction of the Smithsonian Institution are the National Museum, charged with preserving and utilizing objects of art and ethnological, geological and mineralogical collections belonging to the United States, and the Bureau of American Ethnology.

Secretary.—C. G. Abbot.

Government Bureaus Under the Direction of the Smithsonian Institution:

National Museum.—Alexander Wetmore, Assistant Secretary in Charge.

National Gallery of Art.—William H. Holmes, Director.

Freer Gallery of Art.—John E. Lodge, Curator.

Bureau of American Ethnology.—M. W. Stirling, Chief.

International Exchanges.—C. G. Abbot, Secretary in charge.

National Zoölogical Park.—William M. Mann, Director.

Astrophysical Observatory.—C. G. Abbot, Director.

Regional Bureau for the United States International Catalogue of Scientific Literatures. — Leonard C. Gunnell, Assistant in charge.

National Academy of Sciences:

President.—Thomas H. Morgan.

Vice-President. — Frederick E. Wright.

Foreign Secretary.—R. A. Millikan.

Home Secretary.—David White.

Treasurer.—Joseph S. Ames.

Assistant Secretary.—Paul Brockett.

Chairman, National Research Council.—George K. Burgess.

Pan-American Union.—L. S. Rowe, Director General.

General Accounting Office.—J. R. McCarl, Comptroller General of the United States.

Civil Service Commission.—Commissioners.—William C. Deming, President; George R. Wales, Jessie Dell.

Interstate Commerce Commission.—Commissioners: Ernest I. Lewis, Chairman; Balthasar H. Meyer, Clyde B. Aitchison, Joseph B. Eastman, Johnston B. Campbell, Frank McManamy, Thomas F. Woodlock, Richard V. Taylor, Ezra Brainerd, Jr., Claude R. Porter, Patrick J. Farrell.

United States Bureau of Efficiency.—Herbert D. Brown, Chief.

United States Board of Mediation.—Samuel E. Winslow, Chairman.

Federal Reserve Board.—Andrew W. Mellon, Secretary of the Treasury, Chairman (*ex-officio*); J. W. Pole, Comptroller of the Currency (*ex-officio*).

Governor.—Roy A. Young.

Vice-Governor.—Edmund Platt.

Members.—Adolph C. Miller, Charles S. Hamlin, Edward H. Cunningham, George R. James.
Secretary.—Walter L. Eddy.

Federal Trade Commission:
Commissioners.—Edgar A. McCulloch, Chairman; Garland S. Ferguson, Jr., C. W. Hunt, William E. Humphrey, Charles H. March.
Secretary.—Otis B. Johnson.

United States Shipping Board.—T. V. O'Connor, Chairman.

United States Shipping Board Merchant Fleet Corporation. — Trustees: T. V. O'Connor, President; E. C. Plummer, H. I. Cone, A. H. Denton, Jefferson Myers, S. S. Sandberg, R. K. Smith.

United States Railroad Administration.—Andrew W. Mellon, Secretary of the Treasury, Director General.

United States Council of National Defense.—Patrick J. Hurley, the Secretary of War, Chairman..

United States Board of Tax Appeals. —Logan Morris, Chairman.

Alien Property Custodian.—Howard Sutherland.

United States Tariff Commission.—Thomas O. Marvin, Chairman.

United States Employees' Compensation Commission.—Mrs. Bessie Parker Brueggeman, Chairman.

United States Veterans' Bureau.—Brig. Gen. Frank T. Hines, Director.

Federal Board for Vocational Education.—J. C. Wright, Director.

American National Red Cross.—Herbert Hoover, President; Mabel T. Boardman, Secretary.

Board of Surveys and Maps.—T. W. Norcross, Chairman.

Federal Power Commission.—Commissioners: Patrick J. Hurley, Secretary of War, Chairman.

The Commission of Fine Arts.—Charles Moore, Chairman.

Federal Oil Conservation Board.—Ray Lyman Wilbur, the Secretary of the Interior, Chairman.

Federal Farm Board.—Alexander Legge, Chairman.

Federal Radio Commission.—Ira E. Robinson, Chairman.

FEDERAL CIVIL SERVICE

By Clinton Rogers Woodruff

Honorary Secretary, National Municipal League

PUBLIC PERSONNEL ADMINISTRATION

Recognition of Administrative Problem.—Perhaps the most significant thing in the realm of personnel administration was not in the adoption of new laws, or in the improvement of administrative procedure, or in the survey of personnel now being undertaken, but rather in the awakening, on the part of the administrative group, especially as it was represented at the annual convention of the Civil Service Assembly of the United States and Canada at Ottawa, to the fact that they have a technical scientific problem to cope with, and the recognition of the further fact that this problem must be attacked as technical and scientific problems in other fields are studied and solved. This is not an event of a single year but it seems to have come out into the light more at this past session than at any or all of the others.

Influence Gained by Operating Group.—The attitude on the part of the operating group has been developed by reason of the work of the Bureau of Public Personnel Administration. The people, who do the thinking and who are making real progress, so far as they were represented at the Ottawa convention, are satisfied that the public personnel group is on the right track and at every test of strength it was evident that this group was gaining in power and influence. It has taken a great deal of valuable time to work out this closer relationship between the Bureau and the Assembly and to get the Assembly to take the right track in its attack on the problems which are before its members. This relationship has been fully established and will continue. The Civil Service Assembly will grow more and more into an effective organization for the advancement of better personnel administration.

Personnel Laws and Surveys.—The evidence of a reawakening of interest in personnel problems is also indicated by the number of places that are considering new personnel laws and by the number of surveys that are going on. Texas has been agitating for a merit system law. Some legislation has been passed in North Carolina, which represents new ground. California and Wisconsin have revamped their civil service systems and have adopted new laws embodying a new principle in public personnel administration or at least a new practice. In New Jersey there has been considerable agitation, and the state is about to attack the problem of writing a new law. Surveys are going on in Ohio, Massachusetts, Duluth, and Missouri.

Passing of Old Type Civil Service Commission.—Another significant development in the past year as it relates to public personnel administration is the recognition on the part of administrative officials that the old type of civil service commission, semi-political, loosely organized, with limited powers and also with limited abilities in so far as these abilities will help solve the technical problem, has been found generally ineffective and that the new principle is to recognize the public personnel administration as a professional, technical part of government and to place in the hands of a professional, trained executive nearly all the authority heretofore rather loosely placed in the hands of a lay commission. This is especially notable in Wisconsin, California and Ohio. In connection with this movement there is the recognition that the personnel activities of government, like the financial, must be closely tied up with the executive branch of government.

PERSONNEL POLICE

Civil Service Assembly Research.—Steps taken by the Civil Service Assembly of the United States and Canada to organize itself as a body for coördinated and effective research work with the view of solving some of the technical problems that bother personnel administrators and developing relations with the National Civil Service Reform League and other civic agencies by which practical effect will be given to the results of this research work as soon as they are made available. The Assembly has organized itself into technical sections and technical committees in such a manner as to make a real attack upon problems which have heretofore been wholly neglected by the public personnel group as a group. It has already worked out relations with the National Civil Service Reform League so that the latter body is for the first time securing the advice of the technical group as to the soundness of the things that it advocates and is securing systematically information as to where its advocates of this, that, or the other thing are most likely to be effective.

Administrative Responsibility.—Acceleration of the movement to place responsibility for administration through law in the hands of a single person and to limit the commission where there is one to such quasi-legislative functions as the approval of rules and to such quasi-judicial functions as making investigations and hearing appeals. In Wisconsin, the personnel work has been placed in the executive department with a personnel director completely in charge of its administration and with a commission retained only for a few quasi-legislative and quasi-judicial functions. In California the same thing has happened except that the administrative work is placed in the Department of Finance instead of the executive department.

Organization Work in Smaller Cities.—Attempts in Minnesota so to organize the personnel work as to make it effective in the less populous jurisdictions. Duluth has taken the lead and, thanks largely to the efforts of the Taxpayers Association of Saint Louis County in which Duluth is located, has for the first time in this country seriously considered the manner by which an employment system can be set up and administered in a city of about 125,000 population. In Hibbing, a city of about 20,000 population, also in St. Louis County, an effort is being made to set up a system for the police department.

Coöperative Organization.—Establishment of relations between the Civil Service Assembly and its constituent members on the one hand and such organizations on the other as the International City Managers', organized social workers, organized public health workers and organized librarians, has been in progress for the purpose of developing ways and means of utilizing the experience and information of both groups in improving the administration of the personnel systems in effect.

Service Ratings. — Experimental work directed by J. B. Probst of the St. Paul Civil Service Bureau in developing a plan of service ratings which gives promise of becoming an effective instrument in measuring performance of the job. Mr. Probst started his work about three years ago and in the last year, through coöperation with public and private personnel administrators, has developed a new plan to the state where it is being extensively used not only for experimental work, but also in carrying on actual operations. Tendency of public personnel agencies to employ on their technical staffs young men and women trained by their work in college in the principles and technique of test instruction, in the statistical evaluation of test results, and in other phases of scientific personnel world, should be noted. The demand for examiners, classifiers, and investigators with a technical background now exceeds the supply.

WORK OF FEDERAL CIVIL SERVICE COMMISSION

Examination and Appointments.—The number of persons examined by the Federal Civil Service Commission for the year ended June 30, 1929, was 262,025, and the number appointed was 52,231. This was an increase in the number of appointments over the previous year due not so much to additional activity in any one department, but to the general need for a larger force because of the expanding activities in industry. The chief increases were in the Postal and Prohibition services.

There has been a decrease in the total number of temporary appointments made during the past year as compared with the number the year previous. Only a few of these appointments extended beyond six months. They constitute a trifling percentage of the whole number of appointments.

Prohibition Service.—More than three-fourths of the positions in the Prohibition Service have now been filled through competitive tests. An Act of Congress of March 3, 1927, practically vacated all positions in that service and required that those then in the service, in order to retain their positions, should be examined in competition with applicants on the outside.

Postmasters.—During the year ended June 30, 1929, 892 examinations were held for postmaster in offices of the first, second, and third classes. These positions are not in the classified service, but the examinations are held under an executive order. The highest three are certified to the Post Office Department and thereupon the Commission's function ceases.

Professional Recruiting.—Closer relations have been established with colleges and universities in the effort to recruit junior technical, professional and scientific workers. More than 3000 engineers and nearly 1000 chemists are employed.

Veterans.—By executive order, the veteran preference rules have been liberalized, making an increased number of Government positions available to disabled veterans.

Executive Employees.—There were 587,665 employees in the entire executive Civil Service on June 30, 1929, as against 568,715 in the previous year. The Postal service represents 53% of the total number, with a net increase of 3,860 employees. The number employed in the District of Columbia is 63,904.

Character investigations have been more extensively used in examinations for law enforcement officers, especially in the Prohibition Service and for Customs Patrol Inspector.

Transfers.—Since the Classification Act of 1923, transfers have been less frequent as there is now less incentive for change on the part .of the employee, positions having been standardized in all departments as to duties and salaries. The rule as to reinstatement has been made more liberal to make available increased experience and training of former employees.

Personnel Selection.—Nearly 3,000 positions, the incumbents of which perform work of a legal nature, are in the departmental service in Washington. An effort is being made to develop uniformity in selecting personnel to perform this work.

COMPETITIVE TESTS AND EXEMPTIONS

Special Census Agents.—As finally adopted, the Census Bill excepted from competitive examination about 10,000 of the temporary employees, including the supervisors, interpreters and enumerators. Largely through the efforts of the National Civil Service Reform League and with the support of Senator Wagner of New York it was able to include about 2000 special agents in the competitive class. These special agents are probably the most important of the field positions, in that they check up the work of the supervisors and enumerators. The exemptions in the Census Bureau apply only to the field positions. The departmental administrative positions, even of the new temporary forces, were appointed after competitive tests.

Exemption of Farm Relief Experts.—The McNary-Haugen Farm Relief Bill excluded from the competitive service all the so-called "experts" of the Farm Relief Board. Just how many "experts" there will be is not known, but they will probably run into many hundreds. The League appealed to President Hoover to use his good offices in urging the Federal Farm Relief Board to avail itself on the machinery of the Civil Service Commission in making selections of its subordinates. Unfortunately, the President believes that the places should not be in the competitive service, but that we can depend upon the Farm Relief Board to appoint only competent persons as "experts."

Department of Justice.—Pursuant to an executive order, the Attorney General has been permitted to exempt such positions in the Department of Justice as he deems "confidential." An investigation made by the National Civil Service Reform League showed that many positions, which probably belong in the competitive service, and which are thus classified in other governmental departments, have been exempted from examination under this special executive order. The League has urged upon Attorney General Mitchell elimination of this special rule, so that exemptions from examinations in that department may be made in the same manner as is required by general rule for other departments. This subject was discussed in the September issue of *Good Government.*

Office Sale Investigation.—Investigation of the sale of postmastership and other public offices, particularly in the south, was continued by the Senate sub-committee. Many instances of flagrant violations of the rule, prohibiting undue political activity of Federal employees and wholesale barter of public places, were uncovered during the investigation. The Senate Committee has not yet made its report.

UNITED STATES BUREAU OF EFFICIENCY

Staff.—The United States Bureau of Efficiency is an independent government establishment organized under the Act of Congress approved Feb. 28, 1916. Its permanent staff on July 1, 1929, consisted of the chief, the assistant chief, 30 investigators, 4 scientists 14 clerks, 3 messengers, and 1 under-laboratory apprentice, making a total force of 54 employees. Its trained personnel includes experts in account-ency, in administrative audit, in statistics, in individual engineering, in chemistry, in labor-saving devices, and in office management. It is the business of these experts to bring about better business methods and to reduce costs in the Government service.

Functions and Powers.—The functions of the Bureau are: to investigate methods of business in the Government service; duplication of statistical and other work; needs of the executive departments and independent establishments with respect to personnel, and to establish and maintain a standard system of efficiency ratings for the classified civil service in the District of Columbia. Its duties and

Cities	Average on force in 1928	Separations from force	
		Number	Per cent of average on force
PHILADELPHIA	4,944.0	231	4.67
ALL OTHER CITIES	41,157.5	1,695	4.12
Cities having force of 1,000 or more	32,786.5	1,246	3.80
New York	17,770.5	579	3.26
Chicago	6,079.5	248	4.08
St. Louis	1,836,0	92	5.01
Boston	2,287.5	83	3.63
Los Angeles	2,348.5	129	5.49
Washington	1,273.5	76	5.97
Newark	1,191.0	39	3.27
Cities having force of less than 1,000	8,371.0	494	5.36
Milwaukee	999,5	71	7.10
Minneapolis	542.0	33	6.09
Cincinnati	626.5	61	9.74
Kansas City, Mo.	705.0	63	8.94
Seattle	624.0	32	5.13
Rochester	457.0	12	2.63
Portland, Oregon	376.0	6	1.60
Columbus	359.0	25	6.96
St. Paul	334.0	4	1.20
Dayton	201.0	12	5.97
Trenton	247.5	9	3.64
Fall River	228.0	5	2.19
Wilmington, Del.	150.0	9	6.00
New Bedford	272.5	9	3.30
Schenectady	168.0	1	0.60
Sioux City	82.0	1	1.22
Winston-Salem	86.5	11	12.72
Sacramento	110.0	1	0.91
Racine	60.5	0	0.00
Springfield, Ohio	49.0	2	4.08
Berkeley	51.5	7	13.59
Niagara Falls	99.5	4	4.02
Quincy	109.0	1	0.92
Pasadena	95.0	4	4.21
Pontiac	67.5	11	16.30
Lancaster	52.0	0	0.00
Oak Park	61.0	7	11.48
Kenosha	69.0	0	0.00
Atlantic City	302.5	5	1.65
Mount Vernon, N. Y.	108.0	6	5.56
Madison	61.5	7	11.38
Elmira	57.5	5	8.70
Bay City	51.0	0	0.00
Jamestown	48.0	8	16.67
Brookline	114.5	1	0.87
San Jose	44.0	3	6.82
Austin	47.5	0	0.00
Hamilton	44.0	0	0.00
Stamford	74.5	5	6.71
Rock Island	20.0	3	15.00
Wilmington, N. C.	45.0	0	0.00
Waterloo	31.5	5	15.87
Sheboygan	39.0	0	0.00

powers with reference to investigation in the executive department and independent establishments were extended to the municipal government of the District of Columbia by the Act of Congress approved May 16, 1928.

Duties of Bureau Chief.—The Chief of the Bureau, or an alternate designated by him, is required under the provisions of the Act of Congress of March 4, 1923, known as the Classification Act of 1923, to serve with the Director of the Bureau of the Budget and a member of the Civil Service Commission, or their alternates, as a Personnel Classification board. He is also a member of the Board of Actuaries created by Section 16 of the Act of Congress approved May 22, 1920, providing for the retirement of employees in the classified civil service.

Classification of Positions.—Under the Classification Act of 1923 the Bureau of Efficiency is required to aid the Personnel Classification Board in the classification of positions in the Federal departmental service and in the service of the municipal government of the District of Columbia.

Scope of Bureau Work.—The work of the Bureau divides itself into two classes: First, it studies problems specifically assigned to it either formally by statute or informally by committee of Congress or individual Members of Congress; second, it assists the heads of departments and bureaus, at their request, in studying existing methods of procedure in handling Government work with a view to improving the same. Under a general circular issued by the Chief Coördinator the Bureau is designated as the proper repository of information regarding time and labor-saving office devices, and departments and establishments are requested to consult the Bureau on questions concerning the use of office appliances. Under the general authority conferred upon it the Bureau also gives demonstrations of office devices for the benefit of Government officials. An index of all major activities of the Government is maintained by the Bureau. This index covers the activities of the Government from 1913 to date. It is used as a means to prevent duplication of work in the Government service and as a means to furnish information to Government officials and others regarding the activities of the executive departments and independent establishments.

SEPARATION FROM POLICE FORCES

One of the questions which has been interesting students of personnel problems of recent years has been the separation from Police Forces. The following table, prepared by the Philadelphia Bureau of Municipal Research, gives the figures for the year 1928.

MERIT SYSTEM LEGISLATION

Texas.—For a number of years there has been an agitation for the adoption of the merit system. Governor Moody has been very active in this and some progress has been made although the Governor's attempt to include in the Democratic platform of 1928 a declaration in favor of a civil service law was blocked by the opponents of the system on the ground there were not enough state employees to warrant its adoption and that it would result in the selection of negro employees. A forward step is to be credited to the 41st Legislature, however. A law was passed providing that merit system for counties having a population of not less than 150,000 or more than 175,000 according to the last preceding Federal census and in May the legislature passed a law which some claim embodies the essential principles of the merit system. The Governor is authorized by this law to appoint a state auditor and efficiency expert for a term of two years. Among other duties the auditor is required to examine into the work done by the subordinate departmental employees with particular reference to efficiency. The reports of his investigation are to be furnished to the head of the department, the Governor, the Speaker of the House and the President of the Senate. The auditor, however, has no authority to employ or discharge state employees except in his own department. In approving this bill the Governor said he felt it was a better bill than the proposed civil service bill although the feeling among merit system advocates in Texas is that it is difficult to see how the State Auditor can be regarded as a substitute for a comprehensive civil service law.

Illinois.—Three bills affecting the state service, Chicago city service and the Cook County (Chicago) service were placed before the legislature by the Chicago Civil Service Association. The measures, if adopted would have considerably improved the merit system in Illinois, but none of the measures succeeded in the legislature.

Wisconsin.—The civil service law was materially improved by the passage of a new law made earlier in the year. Administrative responsibility has been vested in the Secretary and Chief Examiner. While the Civil Service Commission has continued, its functions are restricted to quasi-legislative and quasi-judicial matters.

Other Legislation.—Civil service laws were adopted in Multnomah County, Oregon, and Middlesex County, New Jersey.

PERSONNEL AND MISCELLANEOUS

Chicago.—Sundry civic activities have been concentrated in Chicago during 1929. The Bureau of Public Personnel Administration (Fred Telford, Director) has moved its offices to Chicago; as has the International City Managers' Association (Clarence E. Ridley, Executive Secretary). August Vollmer (Chief of Police of Berkeley, Calif.) has joined the faculty of Chicago, to give instructions in police business and administration. Both the Bureau and the Association have headquarters at the University. Dr. Ridley is also a member of the faculty.

New York Veteran Amendment.—The electors of New York State, by vote of 820,233 to 301, 866, amended the Constitution of the State of New York, giving disabled war veterans an absolute preference in appointments and promotions in all branches of the state and municipal civil service. Under this Amendment, a disabled veteran who receives a bare passing mark must be placed at the head of the eligible list for original appointment or for promotion. There is no distinction as between slight disability or serious injury, nor as between injuries received in combat or in clerical or similar service. The preference also applies to the promotions in the fire and police forces and in the public schools. Eight years ago the voters of the State emphatically rejected a similar proposal, but somewhat broader in scope.

Lucius B. Swift, one of the civil service pioneers of the country, died July 3 at his home in Indianapolis at the age of 85 years. Mr. Swift was a leader of civil service reform in Indiana and as an associate of George William Curtis and his colleagues was instrumental in organizing the National Civil Service Reform League. He was an ardent and persistent advocate of the merit system throughout his life. Mr. Swift never held public office but he had a strong influence on public opinion in Indiana and was instrumental in abating many of the abuses incident to the spoils system in that state.

PUBLICATIONS

Two interesting books dealing with the merit system have been published during the year, one entitled *The Romance of Merit System* by Matthew Halloran printed for the author and the other a study of *The National Civil Service Reform League* by Dr. Frank Mann Stewart of the University of Pennsylvania. Halloran's book is really a human document embodying his forty five years of service in the Federal Civil Service Commission. He rose from the position of messenger boy to chief of an important section and to-day is the liaison officer between the commission and sundry government departments. The author does not write as a reformer but rather as a reminiscent observer. His story, however, is really an argument for the merit system. Dr. Stewart's book is a careful study of the work of the National Civil Service Reform League organized in 1881. In addition to giving an account of its activities there is a thoughtful evaluation of its work and of the possible future developments.

PERSONNEL OF THE JUDICIARY

BY WILLIAM M. SCHUYLER

ASSOCIATE EDITOR, THE AMERICAN YEAR BOOK

SUPREME COURT OF THE UNITED STATES

William Howard Taft (Ohio), Chief Justice, appointed 1921.

Oliver Wendell Holmes (Massachusetts), appointed 1902.

Willis Van Devanter (Wyoming), appointed 1910.

James Clark McReynolds (Tennessee), appointed 1914.

Louis Dembitz Brandeis (Massachusetts), appointed 1916.

Pierce Butler (Minnesota), appointed 1922.

George Sutherland (Utah), appointed 1922.

Edward Terry Sanford (Tennessee), appointed 1923.

Harlan F. Stone (New York), appointed 1925.

Officers of the Supreme Court:

Clerk.—Charles Elmore Cropley.

Deputy Clerks.—Reginald C. Dilli, Horatio Stonier.

Marshal.—Frank Key Green.

Reporter.—Ernest Knaebel.

CIRCUIT COURT OF APPEALS OF THE UNITED STATES

First Circuit.—Mr. Justice Holmes; George Hutchins Bingham (New Hampshire); George W. Anderson (Massachusetts).

Second Circuit.—Mr. Justice Stone; Martin T. Manton (New York); Learned Hand (New York); Thomas W. Swan (Connecticut); Augustus N. Hand (New York); Harrie Brigham Chase (Vermont).

Third Circuit.—Mr. Justice Brandeis; Joseph Buffington (Pennsylvania); J. Warren Davis (New Jersey); Victor B. Woolley (Delaware).

Fourth Circuit.—Mr. Chief Justice Taft; Edmund Waddill, Jr. (Virginia); John J. Parker (North Carolina); Elliott Northcott (West Virginia).

Fifth Circuit.—Mr. Justice Sanford; Richard W. Walker (Louisiana); Nathan P. Bryan (Florida); Rufus E. Foster (Louisiana).

Sixth Circuit.—Mr. Justice McReynolds; Arthur C. Denison (Michigan); Charles H. Moorman (Kentucky); Xenophon Hicks (Tennessee); Smith Hickenlooper (Ohio).

Seventh Circuit.—Mr. Justice Van Devanter; George T. Page (Illinois); Julian W. Mack (Illinois); Samuel Alschuler (Illinois); Albert B. Anderson (Indiana); Evan A. Evans (Wisconsin).

Eighth Circuit.—Mr. Justice Butler; Kimbrough Stone (Missouri); William S. Kenyon (Iowa); Arba S. Van Valkenburgh (Missouri); Wilbur F. Booth (Minnesota).

Ninth Circuit.—Mr. Justice Sutherland; William B. Gilbert (Oregon); Frank H. Rudkin (Washington); Frank S. Dietrich (Idaho).

Tenth Circuit.—Mr. Justice Van Devanter; Robert E. Lewis (Colorado); John H. Cotteral (Oklahoma); Orie L. Phillips (New Mexico); George T. McDermott (Kansas).

UNITED STATES COURT OF CUSTOMS AND PATENT APPEAL

William J. Graham (Illinois), presiding judge, appointed 1924.

Oscar E. Bland (Indiana), appointed 1923.

Charles Sherrod Hatfield (Ohio), appointed 1923.

Finis James Garrett (Tennessee), appointed 1929.

Irvine L. Lenroot (Wisconsin), appointed 1929.

COURT OF APPEALS OF THE DISTRICT OF COLUMBIA

George E. Martin, Chief Justice.

Charles H. Robb.

Josiah A. Van Orsdel.

COURT OF CLAIMS OF THE UNITED STATES

Fenton Whitlock Booth (Illinois), Chief Justice, appointed 1905.

Samuel Jordan Graham (Pennsylvania), appointed 1919.

William Raymond Green (Iowa), appointed 1928.

Benjamin H. Littleton (Tennessee), appointed 1929.

Thomas S. Williams (Illinois), appointed 1929.

SUPREME COURT OF THE DISTRICT OF COLUMBIA

Walter I. McCoy, Chief Justice.
Wendell P. Stafford.
Frederick L. Siddons
William Hitz.
Jennings Bailey.
Peyton Gordon.
Alfred A. Wheat.

UNITED STATES CUSTOMS COURT

Israel F. Fischer, Chief Justice.
Byron S. Waite.
Charles P. McClelland.
Jerry B. Sullivan.
George Stewart Brown.
George E. Weller.
George Morley Young.
William J. Tilson.
Genevieve R. Cline.

UNITED STATES MARSHAL'S OFFICE

United States Marshal.—Edgar C. Snyder.

Chief Deputy Marshal.—Stephen B. Callahan.

UNITED STATES ATTORNEY'S OFFICE

United States Attorney, District of Columbia.—Leo A. Rover.

Assistants.—John W. Fihelly, David A. Hart, Rebekah S. Greathouse, Harold W. Orcutt, William H. Collins, M. Pearl McCall, Neil Burkinshaw, John B. Williams, Walter M. Shea, Renah F. Camalier, Charles B. Murray, William A. Gallagher, Hobart Newman, Irvin Goldstein, Arthur G. Lambert, James R. Kirkland, James F. Hughes, John R. Fitzpatrick, Eugene R. Davis.

FEDERAL JUDICIAL PROSECUTIONS

By Jacques Martin Barzun

Department of History, Columbia University

JUDICIAL ACTIVITIES

Although the number of cases on which no action was taken during the past fiscal year amounted to 25,263 according to the report of William D. Mitchell, attorney general, that officer decided upon the expansion of the Department of Justice division concerned with anti-trust law violations. Nevertheless, a number of very important cases was satisfactorily prosecuted by the government, and the total of 149,033 cases shows the increased activity of the Department of Justice over the total of 140,142 pending on June 30, 1928.

ANTI-TRUST CASES

Oil Actions.—The most important of anti-trust prosecutions for the year is found in the action of the United States *vs.* Standard Oil Companies of Indiana, New Jersey, New York; Standard Development Company, Texas Company, Gasoline Products Company, Magnolia Petroleum Company *et al.* The district court for the northern district of Illinois enjoined the defendants and 46 corporations and one individual as secondary defendants from further alleged violations under sections 1 and 2 of the Sherman Act. These violations were held to consist in the pooling among the defendants of 77 patent rights related to oil-cracking processes. The testimony taken was voluminous and took many months for its presentation. Although a special Master in his examination of the case reported favorably on the contention of the defendants that their agreements on the patents did not constitute a combination in restraint of trade, the government held, without denying the right of patents or cross-licenses among primary parties, that the issuance of sublicenses to secondary parties accomplished restraint of trade. In other words, the illegality of monopoly under the Sherman Act is eliminated in the case of patents only in so far as the monopolistic rights of patents extend. The court found all agreements among the primary and secondary defendants illegal and granted decree enjoining them; Anderson, Circuit Judge, dissenting.

Great Western Sugar Co.—The second prosecution under the Sherman Act was begun in the Federal court in Lincoln, Nebraska, on February 7, against the Great Western Sugar Company. Criminal information was filed charging that corporation with buying more than 80 per cent of the sugar beets in Colorado, Montana, Wyoming and Nebraska, and selling more than 80 per cent of the refined sugar. The charge is supported by allegations that in order to keep this natural monopoly the company has defeated the plans of competitive organizations to enter the field by building opposition factories, by increasing the buying price of sugar beets, and reducing the selling price of refined sugar. The court denied the order on a technical ground as well as on the ground that restraint was on manufacture and not on commerce.

Motion Pictures.—Ten motion picture distributors were enjoined from making uniform contracts and enforcing them on exhibitors by a compulsory system of arbitration in a case under section 4 of the Sherman Act, tried in the district court for the southern district of New York. The fact of illegal coercive restraint was found against Paramount-Famous-Lasky Corporation *et al.* in spite of evidence that competition is keen among exhibitors and that these contracts have enhanced it.

Potash Cartels.—The district court of the southern district of New York entered a consent decree Feb. 28 enjoining the defendants in the so-called Franco-German Potash cartel from further operations under their agreements respecting the sale and distribution of potash in the United States. The foreign defendants having agreed to the government's demands, individual action was dismissed against the *Société Commerciale des Potasses d'Alsace* and the *Deutsche Kalisyndikat Gesellschaft*, bringing to an end litigation begun April 7, 1927, to defeat their establishment of a single exclusive selling agent in this country.

Meat Packers.—Again under the Sherman Act the Supreme Court April 16 heard an argument on the question of whether the Court of Appeals of the District of Columbia had jurisdiction to entertain an appeal from the Supreme Court of the District of Columbia in an equity suit brought by the United States. The suit is that of the United States *vs.* California coöperative Canneries, number 375. It arises out of an injunctive decree against five meat packers in 1920, prohibiting them from handling wholesale groceries besides their meat products, which was considered an attempt to control the nation's food supply. No decision has yet been rendered on the case.

Bates Valve Bag Co.—Lastly, under the Clayton Anti-trust Act, section 3, an injunction was sought from the district court at Wilmington, Del., to prevent the Bates Valve Bag Company from restricting the use of their products and from preventing competition in the same trade. The leases of machinery having the effect of restricting such trade were to be declared void when they forced the lessee to use the company's valve bags.

INTERSTATE COMMERCE COMMISSION AND RAILROADS

St. Louis-O'Fallon Case.—An important case to test the valuation methods used by the Interstate Commerce Commission resulted in their being found improper by the Supreme Court in March, 1929. The case is the St. Louis and O'Fallon railway appeal, being taken by the railroad from a refusal by a lower court to enjoin or review the Interstate Commerce Commission valuation. It was held by the appellant that the Commission failed to consider the "reproduction" cost, or the present cost of construction. The contention that excess earnings are not recapturable unless and until the Commission had fixed a general level of rates intended to yield fair return on the property was, however, held untenable by majority opinion of the court, from which Justices Holmes, Brandeis, and Stone dissented. The latter Justice, in giving the minority opinion, emphasized the fact that the commission gave less weight to the reproduction cost than to other factors, but did not omit it entirely. The Commission must exercise a judgment in all valuations and cannot be made to follow a legal imposition.

New York Central.—Another test of the Commission came up in United States *vs.* New York Central Railroad Company to determine whether rates fixed for carrying mails on the railroads are retroactive during the period between date of a petitioner's plea for increase and date of granting that increase. The case was decided by the Supreme Court in favor of the defendant. Mr. Justice Holmes gave an opinion construing the Act of July, 1916, Section 5 as giving authority to the Commission to make changes in rates effective from date of filing petition. The time required for investigation is of such length that it would be unjust not to make the rates retroactive.

Lake Cargo Cases.—In the so-called Lake Cargo cases involving the question whether the Interstate Commerce Commission has the right to prohibit carriers from reducing rates on coal between Kentucky, Virginia, West Virginia, and Tennessee and the Lake Erie ports of Toledo and Sandusky, the Supreme Court denied judicial action on the appeal from the decree of a lower court. No recourse can be had for dealing with the issues at stake. (I. C. C. *vs.* Anchor Coal Company *et al.*).

PROHIBITION

Sept. 26th, Dr. J. M. Doran, prohibition commissioner, reported, for the fiscal year ending June 30, 66,878 arrests under the Volstead Act, the seizure of 15,730 distilleries and the disposal of 5,000,000 gallons of whiskey and beer. On June 30 also 19,700 prohibition cases were pending in the Federal courts, while 7,596 civil injunction suits were started, of which 5,605 were effectively concluded. In inter-district work, 1,087 prosecutions were made on the charge of conspiracy alone, and 396 convictions with more than one year in jail were obtained on this charge.

On the ninth anniversary of the 18th amendment (Jan. 15) Assistant Secretary of the Treasury Lowman asserted that the springs of illicit liquor were being dried up. More stills and less liquor were seized during the past year and therefore the Administration is on the hunt for the larger distilleries which must necessarily be responsible for the discrepancy. Unfortunately, the Federal courts are overburdened. In some jurisdictions violaters are arrested five or six times, their trial not having come up yet on the first charge. The Federal system is unable to cope with the amount of multi-violation in large centers, some twenty-three thousand cases being still pending.

Some cases actually decided during the past year are of importance as precedents. In that of United States *vs.* Frank Kardos and Jennie Gross, the eastern district court of Pennsylvania sustained the issuance of a search warrant upon an affidavit of a prohibition officer "thoroughly acquainted with the odor of mash and moonshine whiskey." In the case of United States *vs.* Bashara Solomon *et al.* the district court for Massachusetts decided that under the Jones-Stalker Act, which makes the manufacture of intoxicating liquor a felony, search without warrant is legal for a Federal prohibition agent if he has "reasonable grounds." The contention of the defendants that the search was illegal and the evidence thus obtained inadmissible was denied by the court which referred to the Fourth Amendment of the Constitution as prohibiting only "unreasonable searches." Distinction is to be drawn when the search is to lead to a lawful arrest and for a felony.

Likewise, familiarity with the taste and smell of intoxicating liquor and the purchase of drinks in a hotel dining-room were held sufficient grounds for a search warrant in the case of the United States *vs.* John M. Sweeney, distinction being specifically made by the court between the facts of the case at bar and that of Proulx *vs.* United States, May 7, 1929.

THE OIL SITUATION

Fall-Sinclair Case.—The prosecution of the Fall-Sinclair fraudulent oil lease cases, dating from the Harding administration, was further pursued this year before the Federal district court at Wilmington, Del., and the Supreme Court of the United States. The Department of Justice filed suit Dec. 29, 1928, against the Sinclair Crude Oil Purchasing Company and the Mammoth Oil Company, charging fraudulent deprivation of at least 20,000,000 barrels of government crude oil. A bill in equity charged Harry F. Sinclair with conspiracy to defraud, with the aid of Albert B. Fall, then Secretary of the Interior. The conspiracy is on two counts, (a) to defraud the United States of its property, consisting of royalty oil accruing and to accrue from its leases of land in Salt Creek Oil Field and (b) to defraud the United States of and concerning its governmental rights to the honest and conscientious services of its officers, and more specifically of these rights as regards the Department of Interior. The contracts of the defendants with others are to be cancelled, and an account of all the profits derived from re-sale to be furnished.

Standard Oil-Elk Hills Case.—On January 2, 1929, the Supreme Court upheld the Department of the Interior in its effort to retain the title for the government to section 36, Elk Hills District of California, now being developed by the Standard Oil Company as a result of a decision Secretary of the Interior Albert B. Fall rendered in 1921. Mr. Justice Brandeis delivered the opinion of the court. The Standard Oil claimed title on the basis of patents issued 1910, these same based on an act of March 3, 1853, by which Congress granted Section 36 to California if the land was not mineral in character. The court held that Fall made no determination of minerality. His order was not a judgment but an administrative act, as such it does not imply that the determination essential to the passing of title has been made.

Sinclair-Burns Jury Shadowing Case.—Further contempt convictions resulting from jury shadowing were affirmed by the Supreme Court of the United States on June 3 in respect of H. F. Sinclair, Henry Mason Day and W. Sherman Burns. In the trial of the first of these, together with Albert B. Fall, the appellants had engaged operatives of the Burns Detective Agency to shadow the jury. Mr. Justice McReynolds giving the opinion of the court, found in the facts, misbehavior tending to obstruct the administration of justice. "The reasonable tendency of the acts is the proper criterion —not the actual effects on the juror's mind or the consciousness of extraneous influence."

Fall Conviction.—Lastly, Albert B. Fall was sentenced to one year in jail and was fined $100,000 on November 1st by Justice Hitz in the Supreme Court of the District of Columbia on a charge of statutory bribery in connection with the naval oil leases of 1922. Petition to dismiss indictment on plea of double jeopardy and *res adjudicata* had been denied October 8. In the face of the defendant's physical condition even the light sentence equal to one-third of the maximum imposable was suspended.

UNFAIR PRACTICES

Trade Competition.—The Supreme Court on April 10 considered the case of the Federal Trade Commission *vs.* Alfred Klesner *et al.*, involving the question of unfair competition in commerce. The decision against the petitioner posits that public interest must be shown before the commission may prosecute. It holds that there was adequate remedy at law and no necessity for administrative action. In a suit by the Federal Trade Commission against the Royal Baking Powder Company and the McFadden publications two victories were registered for the commission. In the latter case the defendant has appealed. Disparagement of competitors and misrepresentation of documents as well as of subscription prices were the practices judged unfair.

Commercial bribery also was held unfair by the Circuit Court of Appeals of the sixth circuit in the Grand Rapids Varnish Company case. This decision establishes a precedent in its order to the Company to desist from giving employees of its customers varnish and other products as inducements to purchase.

Misrepresentation.—Fourteen other cases involving misrepresentation, misnomers, and deceptive markings have been started by the Federal Trade Commission and are pending.

RADIO

The authority of Congress to regulate broadcasting was sustained March 11, 1929, by the district court of the northern district of Illinois in a case of United States *vs.* American Bond and Mortgage Company *et al.* The test was really of the constitutionality of the Radio Act of 1927 and its 1928 amendment. Evidence was collected bearing on the actual limits of interference among radio broadcasting stations in a given area, and was held to show that public interest needed protection by the Federal Radio Commission over against the rights of private property. The Radio Act was found within the power of Congress to regulate interstate commerce. Broadcasting and receiving constitutes in the opinion of the court a modern form of interstate commerce.

IMMIGRATION AND NATURALIZATION

Graber Case.—Two cases of unequal importance came before the courts in this category. United States *ex rel.* John Graber *vs.* Arthur J. Carnuth, director of immigration, came up before the circuit court of appeals for the second circuit. A Rumanian resident of Canada was denied the status of a British citizen and was held to have been properly excluded from the United States, since British citizenship clearly means permanent and not temporary allegiance to the British Empire.

Rosika Schwimmer.—In the more important case of United States *vs.* Rosika Schwimmer, a fifty-year old woman pacifist, was denied naturalization owing to a refusal to promise that she would bear arms in defense of the United States. Supreme Court Justice Butler gave the decision on May 27 asserting that a person without any sense of nationalism is not held by ties of affection to any government and as such is incapable of the devotion to the Constitution required of aliens seeking citizenship. Mr. Justice Holmes, in dissenting with Mr. Justice Sanford, asserted that her opposition was philosophical and that one of the important principles of the Constitution was freedom of thought, which this refusal to grant naturalization in the case at bar openly violated and contradicted.

COGNATE SOCIETIES

AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE, 3622 Locust St., West Phila., Pa.

AMERICAN BAR ASSOCIATION, 209 S. La Salle St., Chicago, Ill.

AMERICAN CONSTITUTIONAL LEAGUE, 27 William Street, New York, N. Y.

AMERICAN DEFENSE SOCIETY, INC., 154 Nassau Street, New York, N. Y.

AMERICAN POLITICAL SCIENCE ASSOCIATION, Angell Hall, Univ. of Michigan, Ann Arbor, Mich.

BETTER GOVERNMENT LEAGUE, Washington, D. C.

COMMERCIAL LAW LEAGUE OF AMERICA, 137 S. La Salle St., Chicago, Ill.

HONEST BALLOT ASSOCIATION, INC., 120 Broadway, New York, N. Y.

LEAGUE FOR POLITICAL EDUCATION, 113 W. 43rd St., New York, N. Y.

LEAGUE FOR PUBLIC DISCUSSION, 500 Fifth Ave., New York, N. Y.

NATIONAL ASSOCIATION OF LEGAL AID ORGANIZATIONS, 3660 University Ave., Los Angeles, Calif.

NATIONAL ASSN. FOR CONSTITUTIONAL GOVERNMENT, 716 Colorado Bldg., Washington, D. C.

NATIONAL CIVIL SERVICE REFORM LEAGUE, 519 Fifth Ave., New York, N. Y.

NATIONAL INSTITUTE OF PUBLIC ADMINISTRATION, 261 Broadway, New York, N. Y.

VOTER'S EDUCATIONAL LEAGUE, 524 First Avenue, New York, N. Y.

DIVISION IV

STATE GOVERNMENT

NATIONAL AND INTERSTATE RELATIONS OF STATES

By J. M. Mathews

Professor, University of Illinois

PROHIBITION

Federal and State Authority.—A question which continues to be much discussed is that as to the respective duties of the National and state governments in enforcing the Eighteenth Amendment. Some important states, such as New York, Wisconsin, and Maryland, decline to accept any responsibility for enforcement on the ground apparently that it is the sole duty of the National Government. In Wisconsin, a referendum was held in April in which the wets were successful. As a result, the legislature repealed the state enforcement law and abolished the state department of prohibition and ended all coöperation by the state with the authorities of the National Government in enforcing the Volstead Act. In Illinois an attempt was made to pass a similar repealing law, but it failed by a narrow margin.

Concurrent Jurisdiction.—President Hoover's law enforcement commission, of which former Attorney-General Wickersham is chairman, has been looking into this matter. At a conference of state governors held at New London, Conn. in July, Mr. Wickersham submitted certain suggestions through one of the delegates, Gov. Roosevelt of New York. After suggesting that the governors recommend the enactment of legislation by their respective legislatures looking towards the compilation of uniform crime statistics, Mr. Wickersham said: "The Eighteenth Amendment confers upon the States concurrent jurisdiction with the National Government for the enforcement of this measure. Thus far the Federal Government alone has borne the brunt of enforcement. It seems to me that the Governors' Conference might well consider approaching the Federal Government on some feasible proposal to share this burden. If the National Government were to attend to preventing importation, manufacture and shipment in interstate commerce of intoxicants, the State undertaking the internal police regulations to prevent sale, saloons, speakeasies and so forth, national and state laws might be modified so as to become reasonably enforceable and one great source of demoralizing and pecuniarily profitable crime removed." The Conference of Governors took no definite stand, merely adopting a resolution endorsing the work of the President's commission.

WESTERN CONFERENCE OF GOVERNORS

Another conference of governors was held at Salt Lake City in August at which was read an important communication from President Hoover suggesting the turning over to the individual states of the vast acreage of public lands together with valuable water rights in the West now under the supervision of the Federal Government. The Conference devoted attention especially to Western problems, such as reclamation, highways, oil, public lands and forests.

BOULDER DAM

Interstate Water Distribution. — The Boulder Dam Bill was finally passed by Congress. The distribution of the water to be derived from this project was to be regulated by the interstate agreement promoted in 1922 by Mr. Hoover while Secretary of Commerce. The agreement was negotiated between the seven states of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming. Under the act of Congress, the agreement was to go into effect when six of these states had ratified the agreement. Early in the year Utah signed the compact, making the necessary number of six states. President Hoover, in June, issued a proclamation declaring it to be in effect. In this connection, he said: "The compact itself relates entirely to the distribution of water rights between the seven states in the basin. It has nothing *per se* to do with the Boulder Canyon development except that it removes the barriers to such development. . . . It is the final settlement of disputes which have extended over twenty-five years and which have estopped the development of the river. . . . It is the most extensive action ever taken by a group of states under the provisions of the Constitution permitting compacts between states."

Arizona Protest.—Arizona, however, gave notice that that state would contest the constitutionality of the Boulder Dam Bill in the courts, and would challenge the authority of Congress to allocate the water of the Colorado River.

WATERWORKS TAXATION

Another compact between states, made with the consent of Congress is that between Missouri and Kansas providing for the exemption from taxation of certain waterworks property of the twin Kansas Cities, located outside the limits of the respective states. A decision of the U. S. Circuit Court of Appeals, handed down during the year, construed this exemption to extend to special assessments.

STATE APPORTIONMENT IN CONGRESS

As pointed out in THE AMERICAN YEAR BOOK for 1928, Congress again failed to make the reapportionment of representatives to which each state is entitled in the lower House of Congress upon the basis of the decennial census of 1920, as by implication required by the Constitution. This omission was finally remedied at the special session of Congress held in 1929, to the extent of providing for a reapportionment in connection with the census of 1930.

GREAT LAKES DECISION

In January the United States Supreme Court rendered a decision holding that the Chicago Sanitary District must cease its diversion of water for sanitary purposes from Lake Michigan as soon as possible. The Court declined to issue an injunction compelling immediate cessation of diversion, and the District is allowed a reasonable time to provide other means of sewage disposal. The main contention of the complainants—other states bordering on the Great Lakes—is upheld, however, in that the decision seeks to restore the navigation level of all the Great Lakes as demanded by them. In March, Charles E. Hughes, as master in chancery, began hearings in Chicago to determine how much time the District may have to complete projects for another method of sewage disposal.

STATE CONSTITUTIONS, INITIATIVES AND REFERENDA

BY FREDERIC H. GUILD

PROFESSOR, UNIVERSITY OF KANSAS

STATE AMENDMENTS

General.—Few constitutional amendments were submitted to popular vote in 1929, the usual situation in odd years. Sixteen amendments were proposed in six states. Of these thirteen were adopted and three were defeated. Chief interest centers in the provision for the meeting of a constitutional convention in New Hampshire in June, 1930. Salary increases were approved in two states, for judges in Kentucky and for legislatures in Wisconsin. Similar provisions for judges and for the governor in Texas were defeated. The attempt to modernize the articles on the Supreme Court failed in Texas, but New York authorized the curtailment of the criminal jurisdiction of the justice of the peace. The Ohio tax amendment is also important.

Delaware and Kentucky. — Delaware adopted the amendment authorizing zoning of cities. Kentucky approved the exemption of judges of the court of appeals from the present provision which limits salaries of all officials except the governor to a maximum of $5000. The attempt to liberalize the amending process failed. The purpose was to permit the submission of any number of amendments at one time instead of two only as at the present time.

Maine adopted three amendments. Two dealt with highway or bridge bonds. The limit on state highway bonds was increased from $16,000,000 to $31,000,000, and an additional issue of $1,200,000 was authorized for the Waldo-Hancock bridge. The third amendment concerned the filling of vacancies in the council, authorizing appointment by the governor and council instead of election by joint ballot of the two houses.

New Hampshire. — The constitutional convention, approved by popular vote in 1928, was called by the legislature to meet in June, 1930.

New York submitted the largest number of amendments, all five being approved. Two dealt with veterans, the first extending absentee voting to those absent in United States Veterans Bureau hospitals. The second gave civil service preference to soldiers, sailors, marines or nurses of the United States disabled in any war. Home rule for Westchester and Nassau counties was further extended. Charter changes or laws affecting the government of these counties now require approval of the governing bodies of the counties. If disapproved, the laws are not effective unless affirme by popular vote in the county concerned. This extends to these two counties a safeguard already familiar fo New York cities. The fourth amendment extended the purposes for which the state might contract debts to include fighting forest fires. The fifth authorized the transfer of the powers of justices of the peace in criminal matters to inferior courts, the territorial jurisdiction of which, outside of cities, may be defined by the county board of supervisors.

Ohio adopted one amendment on taxation, clarifying classification of property. The uniform rule provision is retained solely for lands and improvements. The amendment also included a provision limiting the tax levy to one and a half per cent of value on property taxed according to value.

Texas.—Two amendments were submitted and defeated. The revision of the articles concerning the Supreme Court proposed to increase the number of judges from three to nine, to omit any mention of specific salary, and to permit the court itself to determine its own jurisdiction. The other proposal was to increase the salary of the governor from $4000 to $10,000.

Wisconsin adopted the two amendments submitted. The first struck out the old provision of $500 for legislative compensation, leaving the salary to be determined by law. The second concerned terms of sheriffs. The former provision made a sheriff ineligible to succeed himself until a lapse of two years. The new section is for not more than two two-year terms in succession.

REFERENDA

Maine.—There were no measures initiated and but two laws referred for popular action in 1929 although several states have referenda pending for vote in 1930. The Maine legislature referred two measures, both being defeated in the election Sept. 9. The first proposed to increase the gasoline tax from four to five cents. The second was an act of nineteen sections providing for the exportation of hyro-electric power. Maine has been xtremely unyielding in attempting to aintain state control of the power tuation. This act appeared to liber- ize the existing law. It authorized he incorporation of companies for the urchase and transportation of power, ithout power to own or control any enerating plant, nor to sell the power within the state. A permit of the public utilities commission was to replace the present requirement of a special state law in each case. The act (Pub. Laws. 1929, Ch. 280) is of interest as the most recent attempt to solve the problem of hydro-electric power development with strict state control of its natural resources.

CHANGES IN ELECTORAL LAWS

BY CHARLES KETTLEBOROUGH

DIRECTOR, INDIANA LEGISLATIVE BUREAU

OTERS AND VOTING PROCEDURE

Registration or Enrollment. — orty-eight laws were passed by 16 tates making changes in the regis- ration or enrollment acts. Of these, one is of particular significance ex- pt the law passed in Michigan which llows substantially the recommen- ations of the Committee on Election dministration of the National Muni- ipal League. This law provides for ermanent registration of voters by eans of a card or loose-leaf system, ith ample means for enrolling new oters, purging the records of obsolete ames and the transfer of names of oters who move from one jurisdiction another.

Law Provisions.—Detailed changes ade in the existing registration laws clude provisions for the appointment f registrars; changes in party affilia- on; notice of registration; oath re- uired of registrants; transfer of cer- ficates of registered voters; meetings f registration boards; manner of gistrating; method of purging and mpiling the lists; readjustment of e registration period; registration f absentee voters; notification of oters whose names are stricken from e lists; judicial procedure for the instatement of names stricken from e list; use of the registration books the election; form and contents of e registration lists; disclosures of e age of the registrant as 21 years over; places of registration; com- osition of the registration boards; mpensation of registration officials; suance of removal certificates; registration of persons moving into the state; and posting of the names stricken from the registration lists.

Voting Requirements.—Illinois enacted a law providing for registration of voters in villages, incorporated towns and cities of over 200,000, during the period intervening between elections, with the board of election commissioners, and requiring registration in order to vote at a primary election in cities of 500,000 and over, and in all other municipalities having a board of election commissioners. In third class cities, in Pennsylvania, street lists of voters are made up and printed in pamphlet form. In certain towns in Rhode Island voters are permitted to register on election day. Florida requires the registration periodically of voters in a designated group of counties, and Maryland in certain cities and counties. In New York, voters absent during the regular registration period are permitted to register with the central registration board.

Absent Voters. — Minnesota, Nebraska and Oregon extended the law to include voters unable to attend the election because of illness or physical disability; New Hampshire and North Carolina require a list of voters who vote by absent voters ballot to be posted at the polls; in New Mexico, an absent voter's ballot can be delivered only to the voter himself; in New York, persons who register at a central registration place may apply for an absent voters ballot at the time of registering; South Dakota prescribed specifically the manner of marking and counting absent voters' ballots; Utah, the form of application, the affidavit of the voter and the duty of the election officials; and Vermont, the form of the application and the delivery, printing, distribution and form of the ballot. California authorizes a voter to vote before a county clerk or register of voters in person or, when absent or disabled or in a military camp, before any officer authorized to administer oaths, and prescribes the time when the ballots must be canvassed. Massachusetts made a change in the form of application for a ballot, and Nevada provided that the applications for ballots may be made in person, by mail or telegram and prescribed the form of the affidavit and also prescribed the method of voting.

Voting Machines.—In Pennsylvania a law relative to the use of voting machines authorized any county, city, borough or township, by a majority vote of the electors, to adopt and use voting machines. Florida authorized the experimental use of voting machines by any county or municipality; and four similar laws, applying to certain counties, were passed. New York prescribed the form of ballot to be used on voting machines, requirements of the mechanism, authorized the use of machines in union free school district elections, and provided for the care and custody of machines. Michigan made a number of detailed changes in the law relative to the use of voting machines.

CORRUPT PRACTICES

The Corrupt Practices Act of Massachusetts was extended to apply to every committee or combination of 5 or more voters who attempt to promote the success or defeat of any political party. The law of New York prohibits corporations or joint stock associations from contributing to campaign funds. Detailed changes made in the laws of other states limit the amount of campaign expenditures, extend the law to cover primary election expenses, and provide for the method of filing of campaign expenses, making a comprehensive law.

NOMINATIONS

Illinois authorized parties casting more than 2% of the vote of the state to make nominations for township and school district officers and officers of cities, villages and towns having a population of 5000 or less in conventions and provided that conventions for the nomination of judges shall consist of one delegate for each 500 voters. Nebraska provided for the formation of new parties by mass convention and requires the secretary of state to attend to see that the law is omplied with. Massachusetts provided for the party nomination of elective officers in Lowell.

Other laws passed provide for the dates of the state and local conventions; the apportionment of delegates; composition of delegations, including equal representation for women; composition of conventions called to organize new parties; prescribing the method of electing delegates to national conventions; duties and hours of meeting of party caucuses; and duties of state conventions.

PARTY COMMITTEES

New York authorized the state committee of each party to provide by rules for equal representation of the two sexes from each unit of the state entitled to representation, and Indiana requires the equal representation of men and women on party committees.

GENERAL ELECTIONS

Michigan provided that ballot boxes shall be equipped with a device for closing the slot so that they cannot be opened without unlocking the box and each box must be equipped with a seal similar to the seal on a railroad car. In Minnesota, all first class cities are authorized to install time controlled seal presses in the voting precincts for voting paper ballots. The ballot is stamped by means of a mechanical device, the ballots are counted as cast and the press is operable during the legal voting hours only. In New Jersey, in counties of the first class, the superintendent of elections is authorized to seal any ballot box used in the election.

New Hampshire and Connecticut provided that persons who move from one voting district to another may retain their residence in the former district until they have acquired a residence in the latter. Michigan and Nevada provided for placing the names of the candidates for President and Vice-President on the ballot in lieu of or in addition to the names of the electors.

PRIMARIES

In Illinois, park commissioners and the officers of cities under special charters were exempted from the primary; in Florida, county commissioners of certain counties were made subject to the primary and in other counties they were exempted; Massachusetts authorized a preference vote for President and provided that the question of using the primary in Fall River shall be submitted to the voters for determination; in Indiana, candidates for governor and United States senator will hereafter be nominated by the state convention and the preference vote for President and Vice-President has been discontinued. In North Carolina, McDowell and Ashe counties have been placed under the operation of the primary law.

In Illinois, the law authorizes any person to file objections to the certificates of nomination or nomination papers of any candidate and creates a board for the state and for each political subdivision thereof to hear objections and to decide all questions.

STATE LEGISLATURES AND LEGISLATION

By J. M. Mathews

Professor, University of Illinois

LEGISLATIVE ORGANIZATION

Most of state legislatures meet in regular session only once in two years. There seems to be a tendency for the few states still having annual sessions to go over to the biennial plan. In his message to the South Carolina legislative session of 1929, Governor Richards recommended that such a change be made. The governor of Utah suggested the establishment of a legislative reference bureau to assist the legislators in their work. Much time of the legislature is frequently wasted at the beginning of sessions while preliminary matters, such as drafting bills, are being attended to. In order to avoid this waste, Governor Young of California recommended that all bills should be drafted and printed prior to the convening of the legislature. Such a plan would probably result in shortening the first half of the split session usual in that state.

Regular sessions were held during the year in most of the states and special sessions have also been held in a number of states, including two in Texas and one in Connecticut. The session in the latter state was called for the purpose of validating about 1500 laws passed during the previous six-year period which the State Supreme Court held in July had not been validly enacted because they had not been signed by the governor within three days after the close of the session.

THE LOBBY

Lobbying no doubt has its sinister and dangerous aspects; it nevertheless remains true fundamentally that the lobby is an extra-legal method of representation of special economic interests which feel that they would not be adequately represented under the prevalent system of representation of geographical areas. In Massachusetts; lobbyists must be publicly registered as such and proposed bills may be submitted by the people through petitions. In many states, various unofficial citizens' organizations frequently prepare bills and secure the services of individual members of the legislature in having them introduced.

REAPPORTIONMENT

The question of reapportionment of seats in the legislature continues to be much discussed, especially in such states as Ohio and Illinois where there is a rather distinct line of demarcation between urban and rural areas. The urban areas, which are growing much more rapidly than the rural, are generally under-represented and are inclined to resent the imposition by a legislative body thus constituted of taxes the greater portion of which they will have to pay. On this account a movement was started in Ohio for an initiative petition to amend the constitution so as to provide representation in both houses of the legislature on the basis of population. Dissatisfaction resulting from inequalities of representation have even led occassionally, as in Cook County, Illinois, to movements for separation from the state. A resolution was also introduced in the legislature of Kansas providing for the separation of the western portion of the state, which is apparently tired of being the mere tail of the dog. It is not likely, however, that these separatist movements will result in the creation of any new states in the Union, which would require a National Constitutional amendment. The dissatisfaction, however, is apparent.

STATE EXECUTIVES AND DEPARTMENTS

By J. M. Mathews

Professor, University of Illinois

THE GOVERNORSHIP

The Term Question in New York.—The effort which had been made by Governor Smith of New York to secure an extension of the governor's term from two to four years was continued by Governor Roosevelt. The proposal had been accepted by the legislature, but with the proviso that the gubernatorial election should come in presidential years. This proviso was not acceptable to Governor Smith and, largely through his efforts, the proposal was defeated. Governor Roosevelt endeavored to extricate the measure from this impasse by suggesting that the proposal should be divided into two questions, the first involving an increase in the length of the governor's term and the second stipulating the time of the election. This suggestion came to nought, however, through the failure of the legislature to take action.

The Veto.—The number of bills passed by the two houses of the legislature which are vetoed by the governor vary from state to state and from time to time in the same state, depending in part upon whether the governor and legislature are in political harmony. In New York, on account of the custom of electing a Democratic governor and a legislature predominantly Republican, the number of vetoes is unusually large, reaching in 1929 to about twenty-five per cent of the bills passed. It would seem that, in that state, the principal check upon ill-considered legislation is to be found, not in the two-branch legislative system, but in the governor.

Virginia Election.—The only governor elected during 1929 was in Virginia where the success of the Democratic candidate seemed to indicate that the defection of the state from that party as shown in the presidential election of 1928 was only temporary.

IMPEACHMENT

In 1929 two state governors were impeached. They were Long of Louisiana and Johnston of Oklahoma. The attempt to convict Governor Long, however, failed. The impeachment of governors in Oklahoma has become so frequent as to be regarded almost as a matter of course, especially where the majority of the legislature and the governor belong to different political parties. In the 1929 case, the Senate voted to convict, the governor was removed from office and was succeeded by the lieutenant-governor. Out of many serious charges made against Governor Johnston, however, the only one sustained was that of incompetence. Governor Sampson of Kentucky was indicted by a grand jury on the charge of receiving gifts from publishers of textbooks, but was subsequently acquitted.

PARDONING POWER

In their messages to the legislature, the governors of Michigan and Tennessee complained of the burden of time and work involved in the exercise of their powers of pardon and parole. In South Carolina, the governor attempted to revoke a pardon which he found had been secured by fraud. The state supreme court, however, held that the governor could not, even under these circumstances, revoke a pardon and thereby send a person back to jail.

STATE ADMINISTRATION AND JUDICIARY

By J. M. Mathews

Professor, University of Illinois

ADMINISTRATIVE REORGANIZATION

Gubernatorial Support.—Interest in the movement for reorganization of the state administration for the purpose of securing greater economy and efficiency continues with little abatement. This is evidenced by recommendations in legislative messages of about a dozen state governors. They advocate administrative reorganization, with the governor at the head of the system, the short ballot, the executive budget, centralized purchasing and centralized accounting.

New Jersey Survey.—These recommendations, backed by a more or less insistent public opinion, have borne fruit in a number of states. Thus, the New Jersey legislature provided for a general survey of the state government under the direction of Governor Larson. This will include an investigation of the organization and methods of the various state departments and institutions. It is also proposed to install a central accounting system for the state government and a cost accounting system for the state charitable and correctional institutions.

Wisconsin.—A centralized purchasing system was adopted by act of the 1929 legislative session and has gone into effect. A bureau of purchases is established in the executive department at the head of which is a director of purchases appointed by the governor. The duty of the bureau is to purchase all supplies needed by all state departments and institutions, including the state highway commission and the state University. This arrangement vests centralized purchasing power in the bureau which was formerly exercised by various separate agencies, such as the state board of control. Under the direction of Governor Kohler, progress is being made away from the board system of administration and towards more concentrated executive responsibility. Thus, the preparation and submission of the budget has been transferred from the state board of public affairs to the governor. Wisconsin has also extended its civil service system through the creation of a director of personnel and has concentrated its agricultural functions in the hands of one single department.

Ohio.—The legislature of 1927 provided for the creation of an interim committee to conduct a survey of the state administration under the Code of 1921. A firm of private consultants was employed to make the survey and their report was published during the past year in a series of pamphlets. The report recommends a number of administrative changes, including the abolition or reduction in personnel of certain departments and the elimination of overlapping and friction between certain officers and departments, but does not recommend the abandonment of the general system of administrative organization as established by the Code. A new accounting system has also been installed.

Connecticut.—The same firm of consultants also installed an improved system of financial control for the state of Connecticut.

Oregon.—The legislature of 1929 created the State Board of Higher Education, composed of nine members, appointed by the Governor with the consent of the Senate. This board succeeds to the authority formerly exercised by four boards which have been abolished. These boards were the Board of Higher Curricula and the boards of regents of the state University, the state agricultural college, and of the state normal schools. These institutions, through their respective boards, had formerly competed with each other for legislative appropriations. Expenses were increased by duplication of work at the various institutions. The newly created board is expected to eliminate this and to carry out a comprehensive plan of higher education adapted to the needs of the state.

LAW ENFORCEMENT

Criminal Procedure.—Several state crime survey commissions have made investigations and reports but the net legislative result has not been as large as might be expected. Few of the needed changes in criminal procedure have been made. This seems due primarily to the fact that legislatures are composed largely of lawyers, who are, as a rule, inclined to regard criminal procedure mainly from the standpoint of the interests of the defendant. Judges of state courts are also inclined to look at this matter from the same standpoint as lawyers, since their insecurity of judicial tenure may bring about the necessity for them to re-engage in private practice.

Illinois.—Nevertheless, some results may be mentioned. In Illinois, where a voluminous report entitled "The Illinois Crime Survey" was published in July, the legislature passed a bill providing for an increase of the state highway police force. Other bills, however, for the more effective enforcement of law were defeated. In order to sidestep responsibility apparently, the legislature provided for the submission to popular referendum in November, 1930, of the proposal to make women eligible to serve on juries.

California.—The legislature of California placed the Crime Commission of that state on a permanent basis. This commission made a number of recommendations to the legislature of 1929 and, as a result, a state department of penology was created under a director appointed by the governor.

New York.—The Baumes Crime Commission was continued to March 1, 1930, with an additional appropriation. In the legislative session of 1929 the Commission was only partly successful in securing the adoption of its legislative recommendations.

THE JUDICIAL COUNCIL MOVEMENT

Progress. — This movement continues to make rapid progress. By the end of 1928 a total of twelve states had created judicial councils. During 1929 five more states have fallen into line. They are Illinois, Michigan, Texas, Wisconsin, and Idaho. In addition, a voluntary council exists in Pennsylvania, although an act of the legislature designed to give it a legal basis was vetoed by the governor. In Wisconsin, full rule-making authority was conferred upon the Supreme Court and this tribunal in some other states also possesses this authority.

Composition of State Councils.—The Texas law creates a large council composed of twenty-seven members and representing both higher and lower courts, the legislature, the bar, and the state law school faculty. On the Michigan Council of ten members are the attorney-general and representatives of the judiciary, the bar, and the state law school faculty. The Illinois council is peculiar in that it is composed of fifteen members, of whom there are five lawyer members from each of the two houses of the legislature, appointed by the respective presiding officers, and the other five are lawyers or judges appointed by the governor. After the close of the legislative session, the Illinois council made a trip to various parts of the United States and Canada for the purpose of observing the most approved forms of judicial procedure.

Functions.—The various state judicial councils which have been created make periodical reports in which they frequently recommend legislative changes for the reform of judicial procedure and administration. Among these may be mentioned the report of the Connecticut council which was laid before the legislature of 1929. Most of its recommendations for legislation failed to be enacted into law, but its recommendation for the establishment of a state bureau of criminal identification has been adopted.

First National Conference.—In connection with the meeting of the American Bar Association in Memphis in October, the first national conference of judicial councils was held. This doubtless presages a series of annual meetings which will serve as a clearing house of ideas and experience and will form a needed and helpful medium of coöperation among the various state councils.

COUNTY AND RURAL GOVERNMENT

By Orren C. Hormell

Professor, Bowdoin College

REORGANIZATION OF COUNTY GOVERNMENT

Virginia.—A marked advance over 1928 should be noted in the development of a greater nation-wide interest in county reform, resulting in no small degree from the experiments in county government carried on in Virginia and North Carolina. Action of the Virginia legislature under the constitutional amendment of 1928 (See American Year Book, 1928, p. 125) will not be possible until the 1930 session. Public interest in Virginia led the legislature and several counties to anticipate the general legislation and inaugurate interesting changes which have been tested out during 1929. An experiment under the guise of a general county road law has led to a marked degree of concentration of power and responsibility for management in a few counties (See Prof. Wylie Kilpatrick, *County Management*, University of Virginia, 1929). Counties were permitted to choose one out of three forms of road management, (1) direct management by the board of supervisors, (2) management by a county engineer appointed by the board of supervisors, and (3) management by a county "manager" appointed by the board. In addition to his duties with regard to roads and bridges and their accounts, the manager was to prepare the budget for the county, purchase supplies and employ labor. The law contemplated that the "manager" should be the executive officer in all matters relating to the business of the county other than school affairs. The board of supervisors of Albemarle county adopted the "manager" plan. But in actual practice, during 1929, according to Prof. Kilpatrick, the "manager in fact is the county engineer to whom has been granted correlative fiscal powers because the county lacks an accountant or auditor." A coördinator of certain county functions was tried out in that county where the board appointed a "directing engineer." He has charge of roads and bridges and the county public utilities such as sewers and the water system, supervises the accounting system, and acts as purchasing agent. A few other Virginia counties are experimenting with coördination in administration without radical reorganization. The county of Augusta has consolidated several administrative duties under a financial "clerk of the board" to whom the board may prescribe additional duties. Pittsylvania county has unified budgetary control in the hands of the county auditor. In general to date the experiment in Virginia has developed expert management in such fields as finance and engineering but the final coördinating bodies still remain the county board or the state department.

North Carolina, under the county reform legislation of 1927, experimented during 1929 even more boldly than did the Virginia counties. A full time executive in the person of the chairman of the board of supervisors or of the county accountant served in the following counties: Guilford, Mecklenburg, Cleveland, New Hanover, Edgecombe, and Wilson. The experiment of Davidson county is much more notable in that it adopted in full the provision of the state law permitting a county to create the position of a county manager. The North Carolina Laws, 1927, Chap. 91, provides "That two forms of county government are recognized, to be designated as the county commissioners form and the manager form." Under the "manager form" the county commissioners were authorized to appoint "a county manager who shall be the administrative head of the county government, and shall be responsible for the administration of all the departments of the county government which the board of county commissioners has authority to control." Following closely the terminology of the city manager charters the law provides that he shall be appointed for merit only and need not be a resident of the county. The board is given the option of conferring the powers of manager upon the chairman of the board who in such case would be a whole time official. Under the heading of "duties" it is provided that the manager is to be the chief administrative head. The voters may adopt the manager form by popular vote in case the county commissioners fail to adopt it by their own initiative. The commissioner of Davidson county adopted in full the managerial provision of the law of 1927. Under the broad discretionary powers granted by the law to the commission regarding the powers to be granted to the manager, the commission made the manager the tax supervisor, county accountant, purchasing agent and road supervisor. Davidson county thus was the first and probably the only county among the counties of North Carolina and Virginia to accept in its full significance the manager system. It should be noted, however, that the chairman of the board of commissioners in Cleveland county, as manager, exercises practically all the functions exercised by the manager in Davidson county.

MANAGER PLAN FOR COUNTIES

A spirited debate has been carried on among leading political scientists and government experts with regard to the "manager plan" for county government. The debate took the form of a number of excellent articles in the *National Municipal Review*, *American City*, and *Public Management*, and in a discussion at the National Conference on Improving Government, sponsored by the National Municipal League, in Chicago, Nov. 12, 13, 14. The chief opponent of the manager system was Prof. K. H. Porter of the University of Iowa who held that the county functions are too varied and not sufficiently interrelated to justify a unified control. He points out that there is a strong tendency in most states for the state itself to take over many county functions such as highways and health administration. He believes that the way out of the jungle is through greater state supervision for rural counties, and city-county consolidation for urban counties. Prof. Kilpatrick of the University of Virginia, in his pamphlet on *County Management*, warns against transferring by analogy the theories of city government to that of the county. He seems to incline toward multiple management coördinated by the policy-making body rather than toward the single manager idea. Prof. A. R. Hatton of Northwestern University, Prof. W. Wager of the University of North Carolina, Prof. R. A. Egger of the University of Michigan, and Richard S. Childs of New York City advocate the manager plan for counties on the ground that the county as a local government unit is increasing in importance "as shown by the rapid increase of administrative functions, and the enormous increase in the expenditures of counties in all of the populous states." The problem was considered sufficiently important for the National Municipal League to appoint (Aug. 1929) a committee of fifteen on the "county-manager plan." Prof. John

A. Fairlie of the University of Illinois is chairman and Prof. Wager of the University of North Carolina, secretary. "The work of the committee involves a survey of the present conditions in the field of county government for the purpose of drawing up a suggested model law for recommendation to state legislatures."

COUNTY AND TOWN REORGANIZATION IN NEW YORK AND NEW JERSEY

Roosevelt's Position. — Governor Roosevelt in his message to the legislature and in public addresses emphasized the urgent necessity of reform in county and town government. He urged concentration upon reform in governmental structure and the transfer to the counties of functions now poorly administered by towns. Especially he would have taxes collected by the county rather than by the towns. In his opinion, town government in New York is out of date, and often dishonest, while about 55% of all towns are failing to live up to state laws.

Westchester County. (See AMERICAN YEAR BOOK, 1928).—The so-called Westall constitutional amendment which was first passed by the New York legislature in 1927 received the necessary approval a second time in 1929 and was submitted to the voters of the state in November. It received the approval of the voters. The amendment applies to Nassau and Westchester counties and was designed to protect those counties from "ripper" bills. The amendment protects the county against state intervention in that laws creating or abolishing elective offices in these counties, or changing their powers or salaries, do not become effective until approved by the voters in the county. All other local or special laws affecting the county must be submitted to the governing boards of the county for approval or rejection.

The Home Rule Association of Westchester County waged a losing fight against the amendment. It was opposed by the association on the ground that it did not go far enough in referring future changes in county government to a referendum. The next step, probably, will be for the legislature to propose a home rule plan for Westchester county to be submitted to the voters of that county.

New Jersey.—The legislature saw fit to enhance the position of the county as a unit of local government by creating a county traffic magistrate; and by providing for creation, by referendum vote in the county, of a county park commission with broad powers for developing county parks, parkways, play grounds and recreation places. Municipalities were given power to transfer the care, custody, and control of their parks, etc., to the County Park Commission.

COUNTY AND COUNTY-CITY CONSOLIDATION

California.—The problem of the consolidation of San Mateo county with the city-county of San Francisco (See AMERICAN YEAR BOOK, 1928) continued during the year to receive special attention. The plan as sponsored by the Commonwealth Club of California (See *Transactions of the Commonwealth Club*, Vol. XXIV, No. 3) is "that the two counties consolidate under a city-county form of government; that the present charter of San Francisco be improved and altered, or a new charter be drafted, to provide a modern, practical form of governmental procedure applicable to the consolidated area; and that such charter specifically provide for the establishment of boroughs and for local control of local taxation and local affairs in such boroughs, a central legislative body with equitable borough representation, and centralized administration of fiscal and other governmental functions common to the area."

The Federated Pittsburgh Plan.—Although the proposed charter for the consolidated city of Pittsburgh composed of Allegheny county and the cities, boroughs and townships thereof failed to receive at the polls, June 25, the majority required by the constitutional amendment, nevertheless the proposal is the outstanding development during 1929 in the field of city-county relations. The proposal was to combine into one metropolitan or federated city the 122 municipalities in Allegheny county. The plan was for the city to be administered by a board of commissioners with legislative powers so limited that local self-government in boroughs, cities and townships could be retained. The plan was the work of the Metropolitan Plan Commission modified (unfortunately) by the legislature. Prof. Thomas H. Reed was the Director of Research for the commission. Since the charter received a majority of 46,684 votes in the county, and 84 of the municipalities accepted it by a majority vote (a vote of 2 to 1 or better in a majority of municipalities was required under the constitutional amendment) the plan probably will be submitted again in the near future.

COUNTY FISCAL REFORM

North Carolina.—Reform in administration of the fiscal affairs of the county was advanced during the year in North Carolina under the County Fiscal Control Act of 1927, providing for the creation of the office of county accountant to be administered by an experienced accountant appointed by the county commissioners, except in counties now having elected auditors in which case the functions of accountant are to be exercised by the elected auditor. The law further provides that bonds issued by counties and other units of local government must receive the approval of the state sinking fund commission as to necessity and expediency. If the approval is withheld the bonds may be issued only upon the approval of a majority vote of the electors. Each county is required to install a budget system, no floating indebtedness may be incurred, and all bonds must be issued in the serial form. An excellent feature of the law is the provision for a County Government Advisory Commission consisting of five members. The commission is authorized among other things to "prepare and recommend . . . simple and efficient methods of accounting; . . . suggest such changes in the organization of the departments of the county government as will best promote the public interest. . . ." The legislature in 1929 Laws, 1929, S.B. 447) provided that the Commission should supervise the installation in the counties of uniform and standardized auditing and accounting systems, and of forms for financial reports. Economies and increased efficiency resulting therefrom were apparent in a number of North Carolina counties in 1929.

Virginia. — Satisfactory progress was also reported from many Virginia counties with regard to the adoption and installation of the fiscal reform program recommended by the New York Bureau of Municipal Research. (See AMERICAN YEAR BOOK, 1928.)

New Jersey.—The legislature provided that counties may be permitted to exempt from their net debt statement debts incurred for parks up to one per cent of the average assessed valuation. (Laws, 1929, Chap 327.) Further fiscal reform for counties in New Jersey sought through the appointment by the governor of a committee of five for the purpose of making a "complete and scientific investigation of the taxation and financial systems of the several counties. . . ." (Laws, 1929, Joint Resolution, No. 13.)

COGNATE SOCIETIES

AMERICAN CONSTITUTIONAL LEAGUE, 27 William Street, New York, N. Y.

AMERICAN DEFENSE SOCIETY, INC., 154 Nassau Street, New York, N. Y.

CIVIL SERVICE FORUM, 1756 46th Street, Brooklyn, N. Y.

NATIONAL ASSOCIATION FOR CONSTITUTIONAL GOVERNMENT, 716 Colorado Bldg., Washington, D. C.

NATIONAL CIVIL SERVICE REFORM LEAGUE, 519 Fifth Avenue, New York, N. Y.

NATIONAL MUNICIPAL LEAGUE, 261 Broadway, New York City.

NATIONAL STATE ASSOCIATION, 644 Drexel Bldg., Philadelphia, Pa.

VOTERS' EDUCATIONAL LEAGUE, 524 First Ave., New York, N. Y.

DIVISION V

MUNICIPAL GOVERNMENT

CITY POLITICS

By Clinton Rogers Woodruff

Honorary Secretary, National Municipal League

NEW YORK CITY

For several years past there was a movement to reëstablish the Tammany Organization in New York City on a new basis. In the Spring of 1929, George W. Olvany, the leader of that movement having resigned, the question arose in the organization whether the movement for a new Tammany should be continued or there should be a reversion to the older form of organization and management. The advocates of the latter succeeded, and chose as their head John Francis Curry, an old-time district leader. He approved of the renomination of Mayor Walker who had thrown his support in Curry's behalf. The mayor's renomination was followed by an overwhelming reëlection over Congressman La Guardia for a term of four years. Norman Thomas, the Socialist candidate received 175,000 votes, four times as many as four years ago.

INDIANAPOLIS

Indianapolis went Democratic at the November 5th election by a vote of 33,000, making it one of the largest landslides in the history of Indiana. It is generally believed that this result was due to the record of the past two administrations (both Republican) and on account of the corruption and political bosses in the old administrations. The people seemed to want to clean house. As a result of the Supreme Court decision and of the recent election, it is considered likely that a Constitutional Convention will be called to write a new Constitution.

DETROIT

At the primaries in Detroit, Charles Bowles, who had been a Judge of the Municipal Court, and former Mayor John W. Smith, defeated the sitting Mayor, John C. Lodge, who had made a satisfactory record, but who refused to make any campaign for renomination. It is generally believed that if he and his friends had made a canvass, he would in all likelihood have been renominated. At the election on November 5th Judge Bowles defeated former Mayor Smith by a majority of 8,000 in a vote of 256,000, the women favoring the former. Mayor Lodge's retirement from active public service after three years in various city and county offices is viewed with regret by the entire city.

CINCINNATI

In Cincinnati the advocates of the new city manager charter, which has worked admirably for six years, won a substantial victory at the election, Nov. 5. Six supporters of the Charter were elected to the Council, two Republicans and one Independent. All the tax and bond issues, supported by the City Manager and the Charterites were carried, indicating faith in the Administration of City Manager Sherrill. In the words of the *Cincinnati Times-Star:* "The lessons of Tuesday's election in Cincinnati are too obvious to require much comment. The people of Cincinnati believe in Colonel Sherrill and in the Charter group. They expressed that belief in an overwhelming vote of confidence at the polls. A secondary vote of confidence is seen in the large majorities given all the bond issues. In the election of four judges of the Municipal bench the voters of Cincinnati showed considerable powers of discrimination. Apparently Chase M. Davies has been elected to the Board of Education. That victory is one of the significant events of Tuesday in Cincinnati. Davies, with extremely meager political resources, was fighting a deeply entrenched group. On the last day of the campaign, he did not have enough organization to get a political story into the *Times-Star*, a friendly newspaper. The Citizens' Committee group had enough organization to spread their stories all over our political page."

READING'S SOCIALIST GOVERNMENT

It is the opinion of unbiased business people in this community that the Socialist city government is doing surprisingly well. Nothing of a radical nature has been attempted. On the contrary, the responsibilities of office have made the officials decidedly conservative. The only radical measure so far put through has been to unionize the labor in the city departments. Individually the mayor and the councilmen of the socialist group are scrupulously honest. They have given what the city has needed for many years,—a new and up-to-date city hall,—and have managed this in a very judicious way. A new high-school was built in the outskirts, and the old boy's high-school in the center of the town was no longer needed. The present administration took over the building, reconstructed the interior so as to adapt it to the needs of a mayor and council with the various bureaus, and as a result has created a City Hall that can hardly be equaled in a town of similar size in the country. Since the party went into office assessments had to be raised to secure sufficient funds, and this has led them to see that no government can function with an empty treasury.

TYPES OF MUNICIPAL GOVERNMENT

By Clinton Rogers Woodruff

Honorary Secretary, National Municipal League

COUNCIL-MANAGER PLAN

Adoption by Cities.—During 1929, thirteen cities adopted the council-manager plan by charter and three cities adopted it by ordinance:

Charter	*Ordinance*
Charlotte, N. C.	Jeannette, Penna.
Cushing, Okla.	Zion, Ill.
East Detroit, Mich.	Park Ridge, Ill.
Elk City, Okla.	Highland Park, Ill.
Guthrie, Okla.	
Logan, W. Va.	
Orange, Mass.	
Piqua, Ohio	
Redwood City, Calif.	
Saranac Lake, N. Y.	
Shawnee, Okla.	
Tecumseh, Okla.	

In addition, Belfast, Me., adopted a council-manager charter on September 9, but this city has not yet been placed on the official list of council-manager cities.

Revocations.—On January 9, Dearborn and Fordson, Michigan, adopted a mayor-council charter for the combined cities, the former city abandoning its council-manager charter. On May 23, Wheeling, West Virginia, amended its charter to provide for a manager-mayor, thereby removing Wheeling from the official list of council-manager cities.

Kentucky Legislation.—The two laws passed in 1928 by the Kentucky Legislature, providing the council-manager plan for the second and third class cities of Kentucky was declared unconstitutional, May 31, by the Kentucky Court of Appeals on the ground that the statutes had double titles. This decision affects the cities of Lexington, Owensboro, and Covington, which had adopted the plan on November 6, 1928.

Illinois Legislation.—In Illinois, the two optional council-manager bills making it possible for all Illinois cities, including Chicago, to adopt the plan failed after a bitter fight.

Indianapolis.—The Indiana Supreme Court, on September 24, declared the Indiana council-manager law of 1921 unconstitutional, thus reversing the decision of the Marion County Superior Court handed down June 12. The decision of the higher court was based on purely technical points and probably politics also. The council-manager plan will therefore not go into effect in Indianapolis Jan. 1, 1930, and Michigan City will return to the old mayor-council plan on that date.

Pennsylvania.—Four bills which would have made the council-manager plan and proportional representation optional for all cities and boroughs in Pennsylvania were killed in committee when the state legislature adjourned on April 18.

Cleveland.—On August 20, the electors of Cleveland, for the third time in the past two years, voted to retain their council-manager charter. The vote for the amendment was 46,980 and opposed 50,157.

Portland, Me., Sept. 9, by a vote of 7395 to 6901 decided to retain the council-manager charter.

Pending Adoption.—The following cities will vote on the adoption of council-manager charters before the end of 1929: Dallas, Texas, December 17; Flint, Mich., Dec. 2; Yakima, Wash., Nov. 18, and San Diego, Calif., Dec. 19. If the plan does not carry in Yakima, there will be thirty-four states that have cities operating under the council-manager plan, Indiana having been added to the list of cities not having this plan of government.

Appointments and Promotions.—Seventy-one new men were appointed to the profession from Nov. 1, 1928, to Oct. 31, 1929. During this period there were sixteen promotions from one city to another, seven men reentered the profession, and four assistant managers became city managers.

CITY MANAGER GOVERNMENT

Indianapolis. — The Indianapolis City Manager Law was set aside by the Supreme Court of Indiana on what are regarded as rather flimsy grounds. The law required the City Clerk to examine the petitions, calling for a referendum vote on the question of the adoption of the plan. This petition had to be signed by at least 20 per cent of the number of electors that voted at the last preceding municipal election, which, in this particular instance, was approximately 20,000 electors. The clerk was then given five days in which to examine and certify these names to the Council. The Supreme Court held that it was physically impossible for the clerk to examine 20,000 signatures within that period and determine whether or not the signatures were valid and of certified electors. It further held that this was a duty which could not be delegated to deputies.

Application to Counties.—Whether the city manager form of government is applicable to the government of counties has been the subject of interesting debates among students of government. Two illuminating articles on this question appear in the January issue of the *National Municipal Review.* The first, by Prof. Kirk H. Porter of the State University of Iowa, expressed the opinion that county management is impractical, based on the fact that the county is not a unified area of government as is the city, and that county functions are in the main carried out under the direction of the state government and subject to detailed state laws. Prof. Porter believes that the hope for improvement in county administration lies in the direction of increased state control rather than in the centralization of control in the hands of a county manager. Prof. Paul W. Wager of the University of North Carolina, presented the case for the county manager idea by describing the improvements in administration which have been brought about in one year by the manager of a North Carolina county. This Davidson County plan is perhaps the closest approach to county management which has been made. The Board of Commissioners made the manager the county auditor, tax supervisor, purchasing agent, and road supervisor, and appointed his secretary as the county treasurer. Thus was centralized in his office the financial administration of the county. The manager, however, was given no control over health or welfare activities or the administration of justice. Nor would the manager in North Carolina counties have any authority to appoint or remove department heads in those counties where the administration is sufficiently complex to require departmental segregation. The North Carolina law, therefore, meritorious as it is, does not provide county management in the form advocated by the National Municipal League and as described by Richard S. Childs in *The County Manager Plan*.

Illinois.—An effort was made in Illinois to give its municipalities and villages an opportunity to adopt the city manager form of government, but the bill failed to pass.

Statistical.—According to the records of the National Municipal League, 429 municipalities were working under the city manager form of government Oct. 1, 1929. There has been a steady increase in the application of the principle since 1916, when there were 70 communities with that form of government.

Personnel.—Dr. Clarence E. Ridley, of the University of Chicago, who has made a special study of the city manager form of government, was elected secretary of the International City Managers' Association, succeeding John G. Stutz, of Lawrence, Kansas.

ADMINISTRATION AND RESEARCH

By Clinton Rogers Woodruff

Honorary Secretary, National Municipal League

RESEARCH IN RELATION TO GOVERNMENTAL POLICY

National.—In his annual address Dr. Luther Gulick, Chairman, Governmental Research Association and Director, National Institute of Public Administration, said that more truly than ever before in our history as a nation we are adopting the habit of research in dealing with governmental policy and with governmental administration. As evidence he pointed to the unexampled number of governmental commissions and private investigators, such as President Hoover's Commission on Law Observance and Enforcement, and his forthcoming conference on Child Welfare, both of which are relying upon careful study of the situation by experts.

State.—During the year, in Ohio, Delaware, Missouri, California and New Jersey extensive surveys have been carried on for governors and legislature by impartial professional staffs. In Wisconsin a new governor has virtually set up a research bureau within his executive office to deal with state administration. Faced with the problems of old age dependency and the breakdown of public utility regulation, the state of New York has created two important commissions, both of which have selected professional research staffs, without regard to politics, to bring forward all available facts bearing upon the questions at issue. In New York definite research divisions are maintained in at least three of the important state departments and a unique experiment is being made by the tax department which awards fellowships each year for research in tax problems to four graduate students nominated by the leading eastern universities.

Educational and Other Research.—There is of course no need of referring to the increasing volume of governmental research projected or underwritten by the research bureaus, the great universities, the Social Science Research Council, the Spelman Fund, and the other socialized foundations of this country. The establishment at Harvard of a graduate professional school of city planning is a matter of note. The function of this school is not only to train men as professional city planners but also to influence those who are going to be architects, engineers, or civic leaders so that they may understand city planning and prove effective as citizen leaders in their own communities. The school will serve as a research and publication center in city and regional planning.

Government Institutes.—Such investigations as the police survey now going on in Chicago and the study of purchasing procedure in the Borough of Queens, New York, indicate that even the most harassed political officials are coming to realize that there is no problem which cannot be solved better after the facts are known. In civic education, institutes on state and local government were conducted at Buffalo University, Norwich University, and the University of Virginia. The League of Women Voters has carried on institutes especially in Missouri and New York and the League for Industrial Democracy organized a summer school this year on "The Municipal Program." The most notable municipal exhibit of the year for citizen education was that arranged in Los Angeles. The New York Mayor's Conference and the Schenectady Bureau of Municipal Research went on the air with an extensive and well planned program of statewide education in city affiairs. In Cincinnati a Conference on County Government was held by the League of Women Voters and other civic groups.

Conferences. — Educational institutes and conferences for public officials have been extensively attended. The most complete program, and the most widely attended, is that offered by the University of Southern California where the curriculum is largely arranged and conducted by and for public officials themselves. The New York State Conference of Mayors conducted twelve zone police schools with an attendance of 2062 men, and the police school in New Jersey organized by the state police and the League of Municipalities continued its operation. The University of Chicago is now conducting an important police conference.

Crime Reporting System. — The most important single piece of work for the advance of administration this past year is, in Dr. Gulick's opinion, the uniform crime reporting system and guide for police reports drawn up under the auspices of the International Association of Chiefs of Police. The plans worked out are the result of broad research, keen analysis, full recognition of practical and technical problems and the coöperation of administrators and experts. California, New York, and other states and several cities are already going ahead with the program. The art of city reporting has been definitely advanced, especially through the model reports issued by Syracuse and Cincinnati, by Professor Rudley's reporting standards, and by Doctor Kilpatrick's suggestions.

Administrative Progress.—Wisconsin and California have made the greatest administrative progress among the states during the current year. After a generation of experience, Wisconsin, under the leadership of a business governor, is abandoning government by commission, which has long since been discarded by the cities as an inefficient form of organization for carrying on routine administrative work, and is moving toward an integrated executive government, with the executive budget, centralized purchasing and a director of personnel. California's tax program and introduction of a personnel manager are also of special note.

ADMINISTRATIVE CENTRALIZATION

New Department of Hospitals in New York.—Administrative governmental centralization has been receiving a large share of attention in New York City. One of the most important developments has been the creation in the city government of a new Department of Hospitals, thereby bringing under one head, the administrative functions pertaining to hospitalization. Theretofore hospital control and administration were scattered between a separate Board of Health, the Department of Public Welfare and a separate Board of Trustees having control of Bellevue and Allied Hospitals.

Sewage Disposal in New York.—A similar movement is being brought to fruition to combine all of the functions of waste and sewage disposal under one administrative department. Due entirely to an unfortunate political suggestion the measure in the State Legislature which was intended to accomplish this change, failed in the last session, but the reorganization was accomplished through a local law adopted under the Home Rule Amendment of the State Constitution through ratification by the people of the city on November 5, 1929. This measure provides for the consolidation of all of the street cleaning functions which are now handled separately by the Boroughs of Queens and Richmond, and all of the functions of building and operating incinerators, dumps and sewage disposal plants. The proposal very briefly is to create a Board of Sanitation of three members to be appointed by the Mayor for overlapping terms of six years each.

MUNICIPAL HOME RULE

Michigan.—There have been no outstanding developments in the field of municipal home rule during 1929 although there have been a few occurrences and movements that call for mention. The legislative committee of the Michigan Municipal League considers the advisability of a revision of the Michigan Home Rule Act but no tangible results were achieved and the county home rule bill introduced into the Michigan Legislature failed of passage.

Ohio.—There was another attempt made to solve the difficult metropolitan problem, especially as it is complicated by the home rule article of the Constitution. This took the form of a bill to add a method of framing charters for metropolitan areas but failed of passage. The Ohio Supreme Court seemingly retracted to some extent, its sweeping pronouncement in Fremont *vs.* Keating, 95 Ohio St. 468 (1917) which reserved to municipalities the right to regulate the speed of motor vehicles within their boundaries. The cases of Schneiderman *vs.* Sesanstein, 121 Ohio St. 40, 167 N. E. and Eshner *vs.* City of Lakewood, 121 Ohio St. 58, 166 N. E. 904, one decided May 29 and the other June 5, upheld the constitutionality of the state speed law and denied to municipalities the right to reduce its maximum limits. These were set in specific terms for municipalities as well as for the state highways. Airports were held to be public utilities within the meaning of the municipal ownership section of the home rule article in State, *ex rel* Chandler *vs.* Jackson, et al. decided June 19, in the Supreme Court. Likewise, voting machines were held to be legal for municipal elections when adopted or permitted by municipal legislation. State, *ex rel.* Automatic Registering Machine Co. *vs.* Green June 19, not yet reported. This decision reversed the holding of State *ex rel.* Karlinger *vs.* Bd. of Elections, 80 Ohio St. 471 (1909), and was based in part on the home rule article. Elections in Ohio are conducted by a county board, and voting machines were held not legal for county or state elections. Thus their use under this case would necessitate the existence of duplicate sets of election machinery. The new state election code gives the county board the power to adopt the machines as standard equipment for all elections.

Illinois.—No effective steps have yet been taken to give Chicago a larger degree of local independence. That city is still at the mercy of the down-state vote. There has been no re-apportionment, nor has legislation been passed restoring local control of utilities or permitting local governments to take steps to consolidate their work.

Prof. Charles E. Merriam, whose book on Chicago (Macmillan) was one of the outstanding municipal publications in its field during 1929, is carrying on a large scale a series of studies with respect to the governmental chaos in Chicago, but their effect is not likely to be immediate. There is some pressure for coördination of the Finance Programs of City, County and Sanitary Districts, but these have not resulted in any agreements. An Act of the Illinois Legislature removed all oil inspection powers possessed by the City of Chicago and other cities in the State, and vested them in the State Department, known as the Department of Trade and Commerce.

New York.—A decision of far reaching importance of the Home Rule provisions of the New York Constitution was rendered in the test case of Adler *vs.* William F. Deegan, Tenement House Commissioner. On June 25th a Supreme Court Justice pronounced the new Multiple Dwelling Law unconstitutional on the grounds that as it applied only to cities of over 800,000 population, it is limited to New York City and therefore contrary to home rule. Counsel for defendant maintained that the law related to the health and safety of New York citizens and, therefore, did not infringe on the home rule powers of the city body. The case was immediately appealed to the State Court of Appeals July 11 by leading lawyers including representatives from Buffalo and Rochester, who also feared the curtailment of their home rule powers. Aug. 8 the Court of Appeals by vote of 5 to 2 reversed the decision of the lower court and upheld the constitutionality of the law. In the majority opinion Judge Crane said: "The Multiple Dwelling Law here under discussion is a tenement house law with another name. . . . Reason as well as authority justifies the conclusion that these health measures must be a matter of state concern. The police power of the State has never been questioned when it dealt directly with the hygienic conditions of a community. Unless the intent is clear or reasonably certain it should not be limited or whittled away by the reform known as the home rule for cities. Let us recognize in our decision the useful division which custom and practice have made between these things which are considered state affairs and those which are purely the affairs of cities."

COMMUNITY CHESTS

During the year the Philadelphia Bureau of Municipal Research ceased to be a member of the Welfare Federation and resumed independent financing. With the single exception of the Detroit Bureau, which is still loosely attached to the Community Chest of Detroit by benefiting from this fund on a designated basis, all the Bureaus of Governmental Research throughout the country are now independent of community chests.

BIBLIOGRAPHY

Governmental Purchasing, is the title of a new volume by Russell Forbes, Secretary of the National Municipal League, published by Harper Brothers. It explains the existing practices in every phase of the work of the Purchasing Office, from the receipt of the requisition, or estimating requirements, to the approval of the claim for payment.

Public Budgeting by A. E. Buck (Harper Brothers) is a comprehensive study of budgets, national, state, and local; manner of their appropriation, of their development and of their execution.

MUNICIPAL FUNCTIONS

By Clinton Rogers Woodruff

Honorary Secretary, National Municipal League

FIRE PROTECTION

Prevention Program.—For a number of years the loss of life and destruction of property by fire has been a major civic problem. Millions of dollars are spent annually to provide and maintain modern fire extinguishing equipment to put out fires after they occur. Of equal importance is the task of preventing them before they start. In the summer of 1922 the Chamber of Commerce of the United States accepted an invitation extended to it by the Conference of Governors of the Middle Atlantic States to engage in a broad national fire prevention program in behalf of business men. This was undertaken through organization members of the National Chamber in recognition of the fact that fire waste is a local problem which must be solved by local business men through a local program devised in accordance with local conditions and needs.

National Fire Waste Council.—The plan which as drawn up provided for the creation of fire prevention committees by business men's organizations to sponsor local programs of activity. In order to supply groups with the necessary technical assistance, the National Fire Waste Council, representing leading national fire prevention organizations and including within its membership many of the outstanding experts of the country in this field, was formed. It exists for the purpose of assisting member organizations of the National Chamber in their fire prevention efforts and coöperating with other agencies on major fire waste problems. The Council now consists of representatives from twenty-one large national organizations and four governmental bureau. The members are: American Institute of Architects, American Institute of Electrical Engineers, American Municipal Association, American Society of Mechanical Engineers, Boy Scouts of America, Factory Mutual Inspection Department, Fire Marshals' Association of North America, International Association of Citizen Clubs, International Association of Fire Fighters, International Association of Fire Engineers, Motion Picture Producers and Distributors of America, Mutual Fire Prevention Bureau, National Association of Credit Men, National Association of Insurance Agents, National Automatic Sprinkler Association, National Board of Fire Underwriters, National Fire Protection Association, National Safety Council, Railway Fire Protection Association, Underwriters' Laboratories, U. S. Bureau of Chemistry, U. S. Bureau of Forestry, U. S. Bureau of Mines, U. S. Bureau of Standards, and Western Acturial Bureau.

Fire Waste Contest.—As a means of stimulating interest in fire prevention on the part of business men's organizations, the Inter-Chamber Fire Waste Contest was started in 1923. The number of cities entered in the Contest has rapidly grown. At the end of 1923, 165 cities were enrolled; at the end of 1925 there were 420 and this year there are more than 650 entries. Coincident with the activities of the fire prevention committees of many of these cities, splendid loss reductions have been achieved, both as to life and property.

Speakers and Literature.—The National Fire Waste Council is equipped to render aid in furnishing qualified fire prevention speakers and it will also furnish literature and other material which can be used beneficially by local committees. This literature is on such subjects as Fire Prevention Week, fire prevention in public schools, fire prevention in department stores, arson activities, salvage operations, etc.

National Fire Loss.—During the last ten years the fire loss in the United States has mounted steadily higher until in 1926 it reached the enormous figure of $560,000,000. The figures for 1927 show the first downward trend, the loss being $478,000,000. While this is 14.9% less than the previous year, it represents a per capita loss of $4.01. The figures for 1918-1928 are as follows:

1918	$353,878,876
1919	320,540,399
1920	447,886,677
1921	495,406,012
1922	506,541,001
1923	535,372,782
1924	549,062,124
1925	559,418,184
1926	560,548,624
1927	478,245,620
1928	472,224,568

Fire Insurance Rates and Fire Losses.—In Kansas City, Mo., there was a study intended as a fact-basis for future Chamber of Commerce activities and designed to bring about better mutual understanding between buyers and sellers of fire insurance and to bring down insurance rates. It followed a hitherto unblazed trail in seeking and presenting fire protection and fire loss facts and figures, according to the Insurance Committee of the local Chamber of Commerce for which it was undertaken by the Civic Department. Among its findings were these; that the city's rates are based primarily on the loss experience of the whole state, while in fact it maintains a much lower average loss; that the per capita losses are high in comparison with those of the 36 largest cities of the country; and that the fire loss ratio in Missouri is comparatively high, the state ranking thirteenth among the 48 states. Four ways of reducing rates are suggested: improvement of individual property by the owners; more favorable grading of the fire protection facilities of the city; use the lower basis tables for the whole state; and the upholdings of a 10 per cent reduction order issued in 1922 by the State Superintendent of Insurance, and now pending in the courts.

Fire Loss Reduction.—374 cities were participating during 1928 in a fire-waste contest conducted by the Chamber of Commerce of the United States, and there was a decrease of more than $13,500,000 in property loss in the communities participating, as compared with their average annual fire loss for the preceding five years. The per capita loss that year is $2.35 as contrasted with $3.77 in 1925. The per capita loss in 1928 for the whole nation was approximately $4.00. To Detroit goes the honor of making the biggest showing in the fire-waste contest; it is credited with a fire-loss reduction of two million dollars over 1927; and not a single fire spread beyond the building in which it originated. Erie, Penn., is the winner in the 100,000 to 500,000 population class with a per capita fire loss of only 48 cents.

Salvage Projects.—As to important developments in the field of fire protection the increasing development in fire departments of salvage projects is likely to have a helpful effect upon water damage which is usually the largest element in fire losses so far as stocks or goods are concerned.

Fire Prevention Colleges.—A number of state universities have conducted this year for the first time so-called "fire prevention colleges" in which under the auspices of these educational bodies instruction has been given to firemen. The growing belief among the latter that fire extinguishment is an engineering profession stimulating them to study is of considerable significance. The usual revisions of building codes are also of potential significance.

Boston Survey.—Perhaps the most outstanding single item in the fire prevention field has been the fire survey of the City of Boston undertaken at the instigation of the public authorities by the Albert Russell Erskine Bureau of Harvard University, the engineering section of which was made by the field engineering department of the National Fire Protection Association. The publication of this report has been authorized by the Boston City Council. No city in the world so far as we are advised has ever conducted a survey of this sort.

Arson Laws.—For the past three years an active campaign has been in progress to standardize the arson statutes in the various states of the Union. The model law, promulgated by the Fire Marshals Section of the National Fire Protection Association, has now been adopted in twenty-seven states in which under its provisions it is now considered arson for a man to burn his own property as well as the property of another.

Fire Protection at Airports.—The National Board of Fire Underwriters, with the coöperation of the aeronautics Branch of the Department of Commerce, has been working on provisions for the proper construction and protection of airports. These suggested measures have been discussed with members of the aviation industry at meetings in Washington and Chicago, and substantial agreement reached on most of them. A paper by H. E. Nicholas, a member of the Engineering Staff of the National Board of Fire Underwriters, was presented at the National Fire Protection Association in Memphis, Tenn., on May 14. It embodies a discussion of the fire protective methods advocated by the National Board and approved in general by leaders in the aviation field.

Protection Improvements.—Not the least interesting and important developments in the direction of fire prevention are to be found in the devices and improvements that are being introduced. Among the more notable ones during the past year may be mentioned: (a) The increased interest in the storage of x-ray and photographic films in hospitals and allied institutions to safeguard against the unwarranted loss of life and property, where adequate protection is not provided; (b) The activity in the chemical extinguisher industry, as evidenced by the improvement in the extinguishers now in general use and the development of new systems and methods; (c) Extension of the field of application of sprinkler equipment; (d) Fire protection in hangars for aeroplanes; (e) The improvement of motors for use in dust and gas atmospheres to prevent explosions; (f) The increased number of training courses for firemen at State Universities is evidence that we are becoming more fire prevention conscious and that more intelligent and scientific methods are being used for fighting and preventing fires.

Courses for Firemen.—A movement which promises much for the improvement of the fire service is the organization of short courses of instruction and training for firemen. The first of these courses was held at the University of Illinois in 1924, followed a few months later by a similar course at the State Agricultural College at Ames, Iowa; since then at least fourteen such courses were given in 1929, most of them at state universities and with the active coöperation of State Firemen's Associations. These courses are arranged to afford drills and training for firemen in the smaller departments where it is not practicable to organize drill schools like those maintained in the larger cities. The courses include not only subjects relating to actual fire-fighting, but prevention of fire receives the attention it deserves.

Sprinklers and Standpipes.—The application of certain proved fire protection principles to new developments is to be recorded. As for example, the automatic sprinkler in connection with the so-called "deluge system" where large quantities of water are needed over a considerable area in the shortest possible time; and the use of carbon dioxide gas through fixed systems of piping, for the protection of fur vaults and similar places where water damage is to be avoided. The adoption by a number of cities of revised ordinances on the installation of standpipes to convey water to the upper stories of the high buildings are becoming increasingly common.

KANSAS CITY CRIME SURVEY

A widespread feeling existing among its citizens that Kansas City, was not sufficiently protected against the criminal, and the answer of police officials, for the past several years, as in most cities, that what was needed was more men and more money, impelled the Chamber of Commerce of that city to make a comprehensive survey of the Metropolitan Police Department. The actual work of preparing the survey was done by the Kansas City Public Service Institute under the direction of August Vollmer, former Chief of Police of Berkeley, Calif., and now Professor of Police Administration at the University of Chicago. The recommendations of this survey have been approved by the Chamber of Commerce and they are now serving as the basis for improvements in the Department.

The survey was welcomed by the Board of Police Commissioners, who gave their complete coöperation. The report sets forth a suggested plan for the reorganization of the Department; recommendations for an effective system of employment and promotion, and for the establishment of a thorough school of training for patrolmen before beginning active work in the Department; and a plan for the training of officers.

Among material recommendations are the replacement of the present obsolete and inadequate police call system with a modern, instantaneous system of communication between headquarters and district stations and a system of recall lights enabling the district commanders to be in constant communication with the men under their control.

Modern traffic light control will release practically all downtown officers for other service. A new headquarters station, the renovation and reconstruction of several district stations, and the construction of new stations and the relocation of others are important recommendations.

Motorization of the department, except in the congested area, will relieve more men and make patrolling more effective, and the recommendation to revise the record system and to install tabulating machines should enable the inside of the Department to keep pace with the men on the street.

POLICEWOMEN

The activity of the movement to utilize the services of policewomen in the United States is shown by the following table prepared by the International Association of Policewomen (1418 Eye Street, Washington, District of Columbia).

POLICEWOMEN IN THE UNITED STATES

State	City	No. of P. W.	Population	Organization	Remarks
Alabama	Birmingham	4	178,806	Bureau	2 newly appointed p.w.
California	Alameda	1	28,806		
	Arcadia	1			
	Azusa	1			
	Beverly Hills	1			First aerial p.w. on duty in movie colony to enforce town ordinance against stunt flying
	Culver City	1			
	Long Beach	3	55,593		
	Los Angeles	22	576,673		9 additional p.w. provided for but not yet obtained
	Ontario	1			
	Pasadena	2	45,354		1 newly appointed p.w.
	Redondo Beach	1	4,913		
	Sacramento		65,908		1 p.w. to be appointed January 1, 1930
	San Diego				2 p.w. dismissed Mar. 22, 1928
	San Mateo	1			
	Santa Monica	3	15,252		
	Whittier	1 **			
Counties	Eldorado	1 *	6,426		
	Inyo	2 *	7,031		
	Los Angeles	5 *	936,455		
		6 **			
	Madera	1 *	12,203		
	Marin	1 *	27,342		
	Merced	1 *	24,579		
	Monterey	1 *	27,980		
	Orange	2 *	61,375		
	Sacramento	1 *	91,029		
	San Benito	1 *	8,995		
	San Bernardino	2 *	73,401		
	Santa Clara	1 *	100,676		
	Santa Cruz	1 *	26,269		
	Shasta	4 *	13,361		
	Sonoma	11 *	52,090		
	Stanilaus	1 *	43,557		
	Sutter	1 *	10,115		
	Tulare	1 *	59,031		
	Tuolumne	1 *	7,768		
		1 **			
Colorado	Colorado Springs	1	30,105		
Connecticut	Stamford	1	35,096		Honorary special p.w.
County	Fairfield	1	320,936		
Iowa	Mason City				P.w. service abolished
	Waterloo	1	36,230		
Massachusetts	Cambridge	2	109,694		
	Billerica	3	3,646		
	Revere Beach	2	28,823		
Michigan	Battle Creek	1	36,164		
	Flint	1	91,599		
	Highland Park	2	46,499		
	Jackson	1	48,374		
	Pontiac	3	34,273	Bureau	
Minnesota	Minneapolis	7	380,582	Bureau	
Missouri	Kansas City	1	324,410		Expect to create a Bureau shortly

* Deputy Sheriff.
** Deputy Constable.

POLICEWOMEN IN THE UNITED STATES—(Continued)

State	City	No. of P. W.	Population	Organization	Remarks
New Jersey	Asbury Park	1	12,400		
	Belmar	3			During summer only
	Bradley Beach	1			
	Morristown	1	12,548		
	Newark	2	414,524		
	Paterson	2	135,876		
	Westfield	2	9,063		
County	Essex	1	652,089		"County detective"
New York	Buffalo	5	506,775	Bureau	Man at head
	Jamestown	1	38,917		
	Lake Placid	1			During summer only
	Long Beach	1 *			
	New York City	115	5,620,048	Bureau	Man at head
	Syracuse	1 **	171,717		
	Tomkinsville	1			
North Dakota	Fargo	1	21,961		
	Grand Forks	1	14,010		
	Valley City	1	4,686		
Ohio	Youngstown	3	132,358		1 newly appointed p.w.
Oklahoma	Altus	1	4,522		Jackson County sheriff
	Oklahoma City	4	91,295		Matrons given police power
Oregon	Portland	11			2 newly appointed p.w.
Pennsylvania	Pittsburgh	5	588,343		
	Reading	1	107,784		
Rhode Island	Westerly	1	9,952		Rank—"special constable"
Tennessee	Memphis		162,351	Bureau	
Texas	San Antonio	2	161,379		
	Cameron	1 **	36,662		
	Crane	1 **	37		
Utah	Salt Lake City	2	118,110		
Vermont	Burlington	1	22,779		Rank—p.w. and Deputy State Probation Officer
Virginia	Richmond		171,667		No p.w. in dept. at present—appointment for 2 new p.w. pending
Washington	Walla Walla	1	15,503		"Police Matron" but visits dance halls and does preventive work with juveniles
	Seattle	5			
Wisconsin	Kenosha	2	40,472	Bureau	
	Madison	4	38,378		Bureau and p.w. service abolished

* Deputy Police Commissioner.
** Sheriff or Deputy Sheriff.

POLICE INSTRUCTION

University of Chicago has instituted a course in police administration with an initial membership of some twenty persons including representatives of Chicago Police Department, Mason City, Iowa Police Department, the United States Secret Service together with a number of young men contemplating police work as their life profession. This course is in charge of Chief Vollmer formerly of Berkeley Force.

New York.—The New York State Conference of Mayors and other municipal officials have joined forces with the Rockefeller Foundation to promote a model police training system in New York. In connection with this effort these two institutions endeavor to bring about model training offices in New York State. Arrangements have been made to engage and place at the disposal of municipal schools eminent police training experts and to provide intensive training for police instruction.

Philadelphia established a police training school in 1913 with three departments, mental, physical and drill. This was discontinued under the administration of General Smedley Butler but has been reëstablished under the present administration and developed along advanced lines. It is now well established.

Following is a list of cities reporting police training in some form or other:

CITIES REPORTING SOME KIND OF POLICE TRAINING SCHOOL

New York City
Chicago, Ill.
Detroit, Mich.
Cleveland, O.
St. Louis, Mo.
Baltimore, Md.
Boston, Mass.
Los Angeles, Calif.
Buffalo, N. Y.
Milwaukee, Wis.
Washington, D. C.
Newark, N. J.
Cincinnati, O.
Kansas City, Mo.
Rochester, N. Y.
Toledo, O. (two weeks)
Portland, Ore.
Denver, Colo.
Columbus, O.
Providence, R. I.
Oakland, Calif.
Atlanta, Ga.
Salt Lake City, Utah (partly)
Camden, N. J.
Wilmington, Del.
Yonkers, N. Y.
Duluth, Minn. (occasionally)
El Paso, Tex.
Lawrence, Mass.
Schenectady, N. Y.
Little Rock, Ark.
Saginaw, Mich. (weekly instruction)
Lansing, Mich.
Highland Park, Mich.
Berkeley, Calif.
Roanoke, Va.
Jackson, Mich.
Pasadena, Calif.
Lakewood, O.
Omaha, Neb.
Worcester, Mass.
Syracuse, N. Y.
Norfolk, Va.
Hartford, Conn.
Grand Rapids, Mich.
Ft. Worth, Tex.
Scranton, Pa.
Springfield, Mass.
Des Moines, Ia. (instruction)
Trenton, N. J.
Kenosha, Wis.
Lima, O.
Madison, Wis.
Greensboro, N. C.
E. Chicago, Ind.
Pontiac, Mich. (weekly school)
Newport News, Va.
Orange, N. J.
Norristown, Pa.
Watertown, N. Y.

LEGISLATIVE BODIES

There has been a tendency in recent years to reduce the size of local legislative bodies. There are a few that still maintain large ones notably New York and Chicago but the majority of the larger communities have small legislative bodies. The following table prepared by Frederick Rex of the Municipal Reference Library at Chicago shows the number of councilmen in the leading cities, the term of office and indicates whether the candidates are elected on a partisan or non partisan basis.

City	Population Estimated as of July 1, 1928	Number of Councilmen	Term of Office (years)	Partisan or Non-partisan Election
New York City	6,017,500	71	2[1]	Partisan
Chicago	3,157,400	50	2	Non-partisan
Philadelphia	2,064,200	22	4	Partisan
Detroit	1,378,900	9	2	Non-partisan
Los Angeles	1,250,000	15	2	Non-partisan
Cleveland	1,010,300	City manager govt., 25 including mayor	2	Non-partisan
St. Louis	848,100	29	4[2]	Partisan
Baltimore	733,826	19	4	Partisan
Boston	799,200	22	2	Non-partisan
Pittsburgh	673,800	9	4	Partisan
San Francisco	585,300	18	4	Non-partisan
Buffalo	555,800	Commission govt., 5 including mayor	4	Non-partisan
Milwaukee	544,200	25	4	Non-partisan
Newark	473,600	Commission govt., 5 including mayor	4	Non-partisan
Minneapolis	455,900	26	4	Non-partisan
New Orleans	429,400	Commission govt., 5 including mayor	5	Partisan
Cincinnati	413,700	9	2	Non-partisan
Kansas City, Mo.	391,000	9	4	Non-partisan
Seattle	383,200	9	3	Non-partisan
Indianapolis	382,100	9	4	Partisan
Louisville, Ky.	329,400	12	2	Partisan
Rochester	328,200	9	4	Non-partisan
Jersey City	324,700	Commission govt., 5 including mayor	4	Non-partisan
Toledo	313,200	20	2	Non-partisan

[1] President of Board of Aldermen is elected for term of four years.

[2] There are 28 aldermen, one chosen from each ward, all elected at large. President is chosen and elected at large; 14 aldermen elected every 2 years.

DEVELOPMENTS IN ART

Cities in the last decade have maintained a deeper and more intelligent interest in their artistic development and to advance this end have established art commissions. According to a committee of the Portland (Oregon) City Club that is investigating the matter, 17 cities with a population of 200,000 or over have art commissions and 13 of these 17 have full veto powers. The other 4 have only advisory power. The report shows interesting diversities in the functions of the Commissions. In Pittsburgh, the Assistant Secretary of the Civil Service keeps in touch with events and conducts campaigns of public education. A standing committee of three architects and an architectural designer confer on plans for all proposed buildings. Chicago allows the purchase of sculpture, paintings, etc., if within the appropriation. If costing over $500 the consent of the Council must be obtained. Los Angeles allows for the purchase of some art objects, subject to the approval of the council.

Following is a list of cities of 200,000 or over showing those that have an art commission and other data with regard to their functioning:

City	Has an Art Commission	Date of Organization	No. of Members	Term of Office	Advisory Power Only	Full Power to Accept and Reject
Baltimore	Yes	1898	8	....	...	Yes
Chicago	Yes	....	7	3 years	...	Yes
Cincinnati	...	....	...	....	...	...
Cleveland	Yes	....	18	2 years	...	Yes
Detroit	Yes	....	9	3 years	...	Yes
Indianapolis	...	....	...	....	...	...
Kansas City	Yes	....	9	3 years	...	Yes
Los Angeles	Yes	1924	5	....	...	Yes
Milwaukee	Yes	1911	7	4 years	...	Yes
Minneapolis	Yes	....	9	4 years	Yes	...
New Orleans	No	....	...	....	...	...
New York	Yes	1898	11	....	...	Yes
Oakland	No	....	...	....	...	...
Philadelphia	Yes	1919	9	....	...	Yes
Pittsburgh	Yes	1911	9	Dur. Adm.	...	Yes
Portland	Yes	1923	8	....	Yes	...
Rochester	Yes	....	5	....	...	Yes
St. Louis	Yes	....	9	3 years	...	Yes
St. Paul	...	....	...	....	...	...
Salt Lake	Yes	1927	13	Dur. Adm.	Yes	...
Seattle	Yes	1924	21	3 years	Yes	...
Washington	Yes	1910	7	4 years	...	Yes

DETROIT'S CONDEMNATION COMMISSION

Detroit has a condemnation commission the purposes of which at present are threefold: it expedites the reports by departments interested in particular on condemnation projects; it holds hearings with property owners and taxpayers in the special assessment district, if one is provided, at which hearing the probable cost of the project is brought out, the probable proportion that will be raised by special assessment, the probable area of the assessment district, the probable distribution of the assessments over the property within that area; and it reports back to the Council its own findings and recommendations with respect to the necessity, urgency, cost and method of financing.

RADIO

Radio is being utilized by civic organizations to educate the electorate and to spread information concerning current events. Such service has been established in Baltimore, Cincinnati and Louisiana and was inaugurated by the Kansas City Citizens League in February 1927. New York City maintains a municipal broadcasting service over the Municipal Radio Station, its purpose being to give information concerning various municipal functions.

MUNICIPAL MUSIC

Under the Act of Assembly, passed by the 1929 Session of the Pennsylvania Legislature, a Bureau of Music has been established in Philadelphia, with Miss Clara Barnes Abbott as Chief of the Bureau. This Bureau, with the Municipal Department of Music at Baltimore, are the only two of a kind in the United States. There are many civic music associations that help cities and are helped by cities, but these are the only two at work, making music an official part of the

City Administration to occupy profitably the leisure hours of its citizens.

MUNICIPAL REFERENCE LIBRARIES

**Baltimore, Department of Legislative and Municipal Information. Horace E. Flack, Librarian.

**Chicago, Municipal Reference Library, Frederick Rex, Librarian.

**Cincinnati, Municipal Reference Bureau (part of University of Cincinnati), 246 City Hall. Emmett L. Bennett, Librarian.

*Cleveland, Municipal Reference Library, Mary H. Clark, Librarian.

Detroit, Civics Division. The Public Library. Grace England, Chief.

*Los Angeles, Municipal Reference Library, Josephine B. Hollingsworth, Librarian.

*Milwaukee, Municipal Reference Library, Frederick W. MacMillan, Librarian.

Minneapolis, Business and Municipal Branch, 508 Second Avenue, South, Alta I. Hansen, Librarian.

*New York City, Municipal Reference Library. 512 Municipal Building. Rebecca B. Rankin, Librarian.

Philadelphia, Municipal Reference Division, (Part of the Free Library of Philadelphia), Logan Square. Helen M. Rankin, Chief.

*Portland, Municipal Reference Library (Library Association of Portland), 312 City Hall. Caroline L. B. Sigrist, Librarian.

Rochester, Business and Municipal Branch (Rochester Public Library), 13 S. Fitzhugh Street. Gladys E. Love, Librarian.

*St. Louis, Municipal Reference Library. (Branch of St. Louis Public Library), 408 City Hall. Lucius H. Cannon, Librarian.

San Francisco, Business branch, San Francisco Public Library. Anita Levy, Librarian.

Seattle, Municipal Reference Division (Seattle Public Library), Ella R. McDowell, Librarian.

Toledo, Commission of Publicity and Efficiency. Municipal Reference Library, 107 Safety Building. J. O. Garber, Secretary (Resigned—January 1, 1929).

Toronto, Canada. Business Men's Reference Library. (Part of Toronto Public Library), 42 Adelaide Street. Zetta Harper, Librarian.

AMERICAN CIVIC ASSOCIATION

Traveling Annual Meeting.—For three years the American Civic Association has been holding a unique form of annual meeting, which they call a traveling annual meeting and includes a visit to a series of important civic developments. The 1929 meeting was held in Illinois starting at Springfield and zigzagging back and forth across the state ending with the Chicago region. The initial Session was held in Salem Park where Lincoln kept store and postoffice and the concluding meeting was one devoted to regional planning arranged by the Chicago organizations and the Association in Palmer House. Along the way were seen state, county and city parks, rural and town, lake front developments, modern highways, public and private points of note and charming rural aspects. The trip involved meeting the civic leaders in the towns and cities along the route, arranged by Miss Harlean James, the executive secretary.

Various Activities.—During the year the Association published the first *American Civic Annual* which embodied current discussions and descriptions of the more important civic improvements and undertakings by the civic leaders of various types as well as a *Who's Who in Civic Improvement.* In the autumn of the year the Association's representatives joined the inspectors of Cumberland Falls and Federal Power Commission in connection with the protest taken against the utilization of water taken from that beautiful and historic site for power purposes.

CIVIC CONFERENCES

A number of civic organizations met in Chicago during the week of November 11, under the general title of "The National Conference on Improving Governments," which sponsored the meetings of the National Municipal League, the Governmental Research Association, the National Association of Civic Secretaries, and the Proportional Representation League. In addition, the sixth annual meeting of the American Municipal Association met November 14 and 15. This conference brought together the executive secretaries, business managers, and other officials of the various state leagues of municipalities throughout the United States. The National Fire Waste Council met November 12 to 15, and a police conference was held at the University of Chicago, November 11 and 12.

** Not a part of the public library.

* Public libraries which maintain their municipal reference in the City Hall.

ORGANIZATIONS OF MUNICIPAL OFFICIALS

In twenty-nine of the American states there are organizations of municipal officials, and many of these state organizations belong to the American Municipal Association, the Secretary of which is John G. Stutz, Lawrence, Kansas. The following is a list of the state organizations:

STATE LEAGUES OF MUNICIPALITIES AND SECRETARIES

Wm. J. Locke, Executive Secretary
League of California Municipalities
706 Chancery Building
San Francisco, California

Don C. Sowers, Secretary-Treasurer
Colorado Municipal League
University of Colorado
Boulder, Colorado

E. P. Owen, Secretary-Treasurer
Florida League of Municipalities
Jacksonville, Florida

A. D. McLarty, Executive Secretary
Illinois Municipal League
Urbana, Illinois

Frank G. Bates, Executive Secretary
Municipal League of Indiana
Bloomington, Indiana

Frank G. Pierce, Secretary
League of Iowa Municipalities
Marshalltown, Iowa

John G. Stutz, Executive Secretary
League of Kansas Municipalities
Lawrence, Kansas

Dr. J. Catron Jones, Sec'y.-Treas.
Kentucky Municipal League
Lexington, Kentucky

Harold D. Smith, Director
Michigan Municipal League
Ann Arbor, Michigan

Morris B. Lambie, Executive Secretary
University of Minnesota
Minneapolis, Minnesota

Craddock Goins, Ass't. Secretary
Mississippi Municipal Officers Ass'n.
Jackson, Mississippi

John H. Caruthers, Executive Secretary
League of Missouri Municipalities
University of Missouri
Columbia, Missouri

J. H. Hale, Secretary
Nebraska State League of Municipalities
1304 Fifth
Kearney, Nebraska

Sedley H. Phinney, Executive Sec'y.
New Jersey State League of Municipalities
34 West State Street
Trenton, New Jersey

Wm. P. Capes, Secretary
New York State Conf. of Mayors and Other Officials
Albany, New York

E. J. Woodhouse, Secretary
North Carolina Municipal Association
University of North Carolina
Chapel Hill, North Carolina

A. R. Watkins, Executive Secretary
League of North Dakota Municipalities
City Hall
Fargo, North Dakota

J. T. Salter, Secretary
Oklahoma Municipal League
University of Oklahoma
Norman, Oklahoma

J. L. Franzen, Secretary
League of Oregon Cities
Oregon City, Oregon

J. Herman Knisely, Secretary
Pa. State Association of Boroughs
Capitol Building
Harrisburg, Pennsylvania

F. H. Gates, Executive Secretary
League of Cities of Third Class
Wilkes Barre, Pennsylvania

C. S. Monteith, Executive Secretary
League of South Carolina Municipalities
1008 Palmetto Building
Columbia, South Carolina

Fred Strang, Secretary-Treasurer
League of South Dakota Municipalities
Pierre, South Dakota

C. C. Gilbert, Secretary
1014 Stahlman Building
Municipal League of Tennessee
Nashville, Tennessee

Harvey W. Draper, Secretary
League of Texas Municipalities
319 Kress Building
Houston, Texas

W. A. Fraser, Secretary-Treasurer
State Municipal League of Utah
414 City and County Building
Salt Lake City, Utah

Morton L. Wallerstein, Secretary
League of Virginia Municipalities
Travelers Building
Richmond, Virginia

Wallace C. Murphy, Secretary
West Virginia Municipal League
University Extension Division
Morgantown, West Virginia

Frederick H. McMillan, Executive Sec'y.
League of Wisconsin Municipalities
119 Monona Ave.
Madison, Wisconsin

BIBLIOGRAPHY

Two interesting and important studies of municipalities, were published during the year: *Chicago—A History of its Reputation*, by Henry Justin Smith and Lloyd Lewis, and *Middletown*, by Robert S. and Helen Merill Lynd. Both are published by Harcourt, Brace and Co., New York. The former is an account of Chicago, history and its extraordinary growth in population, commerce, wealth and public improvement. The human aspects of the city's career are especially emphasized. *Middletown* is the result of an intensive study of an American City of average size in the central west. It is the result of the study of of a staff of workers sent out by a research foundation. It is the sort of objective study such as an anthropologist might make of native tribes in Central Australia.

METROPOLITAN AND REGIONAL PLANNING

By Charles W. Eliot, 2d

City Planner, National Capital Park and Planning Commission

EXTENSION OF URBAN AREAS

The Regional Unit.—Since the extension of great cities is influenced by physical and economic conditions and bears little or no relation to political boundary lines, planning for the physical arrangement of urban areas has gone beyond "city" planning to Metropolitan, Regional, County or State Planning. The region or metropolitan unit is normally defined by the commuting distance from the central city or business area, by market territories, free delivery areas, or by similar physical or economic factors. A comprehensive plan for the whole region, at least in broad terms, is essential before any of the several elements of the plan or the problems of any one part of the area can be seen in their true relations to other areas or elements.

Planning Projects.—A number of the urban regions of this country have organized to plan and carry out certain regional projects, as, for example, the Boston Metropolitan District for water, sewer and park activities since the early 1890's, but it was not until 1922 that a survey and general study was undertaken of all of the elements of a regional plan. The work of the Committee on Regional Plan of New York and Its Environs, begun in 1922, bore fruit in 1929 in a series of ten survey, and two plan volumes. Work has also been going forward during the last year in a number of other regions about our metropolitan centers. Through a Committee on Regional Planning of the American Civic Association, the experience of technicians in the several regions where activity is greatest is brought together to the great advantage of those beginning work in this field.

NEW YORK CITY

The outstanding event of the year in Regional Planning was the presentation of the Regional Plan of New York and Its Environs in April, 1929. This meeting marked the completion of seven years' work, in collection of data, making of plans, and the analysis and coördination of a number of reports under the direction of Thomas Adams. The cost, approaching $1,000,000, was met by the Russell Sage Foundation. The New York Region comprises 5528 square miles lying in three states, and the plan constitutes, in its maps, drawings, diagrams and descriptive text, a program of suggested action for the period ending in 1965. These proposals include highways, parks, transportation, open spaces, terminals, industrial areas and similar features of a comprehensive scheme for the orderly development of the region. The most notable accomplishments in carrying out the regional plan have been in Westchester County which has its own unofficial Planning Federation and where a comprehensive park system is now being developed.

BOSTON

The Metropolitan Planning Division of the Metropolitan District Commission has planning jurisdiction for the Metropolitan District comprising over 400 square miles. The Division has devoted itself primarily to highway and rapid transit problems since parks, water and sewer systems on a regional scale are well started. Progress has been made with the highway studies particularly in connection with a circumferential route around the congested area. Through the activities of the Trustees of Public Reservations and other private organizations acting through a Committee on Open Spaces appointed by the Governor, a project for a state-wide system of open spaces has been put forward this year as a first step toward a comprehensive state plan. The chief feature of this plan is a Bay Circuit or ring of parks surrounding the Boston Region.

PHILADELPHIA

The Regional Planning Federation of the Philadelphia Tri-State District has started the preparation of a comprehensive regional plan for the 4000 square miles surrounding the city. A remarkable campaign for funds has given this unofficial organization approximately $500,000 for planning work over a three-year period. A large part of the basic survey and research work was completed prior to the campaign for funds. Partly as a result of the work of the Federation an official City Planning Commission for the city of Philadelphia was set up during this year.

BUFFALO

Niagara Frontier Planning Board, with which the Niagara Frontier Planning Association is closely allied, has issued four annual reports and some bulletins. It is at work on a comprehensive plan for an area of 1550 square miles and has already assembled necessary data on highways, parks, transportation, etc. An unusual and particularly close relationship between the official board and a large private association has promoted understanding and coöperation of local authorities in carrying out the plans for the region.

WASHINGTON, D. C.

The National Capital Park and Planning Commission, a Federal commission, has been coöperating with commissions in Maryland and Virginia in the preparation of a comprehensive regional plan for an area of over 450 square miles about Washington. A number of reports, including recommendations on highways, parks, and zoning have been issued by the Commission, and a preliminary plan will probably be presented early in 1930. A proposal for a regional system of parks is now before Congress and detailed studies on water supply, sewerage, and other elements of the Regional Plan were started during the year. Construction was started during 1929 on the Mt. Vernon Memorial Highway connecting Washington with Alexandria and Mt. Vernon, and substantial progress has been made on the projects for parks in the Maryland area and for the Lee Boulevard in Virginia leading from the Arlington Memorial Bridge which is now under construction.

CHICAGO

The Chicago Regional Planning Association has contributed notably to the development of regional planning through its work in coördinating the activities of Federal, State, County and Municipal authorities within the 8000 square miles surrounding Chicago. By keeping before these officials the relation of what they are doing on highways, zoning, etc., to other neighboring parts of the region, a plan for the whole area is gradually being evolved.

LOS ANGELES

The official Regional Planning Commission, County of Los Angeles, is working on plans for an area of 4115 square miles. Among its accomplishments it boasts the first county-wide zoning ordinance adopted in 1927 and unusual success in dealing with subdivisions in unincorporated areas. The Commission has contributed notably to the advancement of regional planning both in its own area and elsewhere through the issue of bi-weekly *Regional Planning Notes* containing news and quotations on subjects of current interest in the field from all parts of the country.

OTHER CITY PLANS

In addition to these regions, work is going forward about Cleveland through the activity of the Cleveland Chamber of Commerce and the Cleveland Federal Regional Highway Committee. A Milwaukee County Regional Planning Department is active in an area of 240 square miles about Milwaukee, and has a zoning ordinance and platting regulations in force. Similarly about Detroit a master highway plan for 749 square miles is in process. The Metropolitan and Regional Planning Association of St. Paul, Minneapolis and environs has published numerous reports and prepared a base map of its region. The Onondaga Regional Planning Commission, and Toledo, Lucas County Plan Board are also active, while the official Santa Barbara County Planning Commission is working on plans for an area of 2700 miles.

These activities indicate that the need and usefulness of regional planning to guide the growth and development of large urban areas is increasingly recognized in these United States.

ZONING

BY H. M. OLMSTED

ASSOCIATE EDITOR, *The American City*

ZONED MUNICIPALITIES

Summary of Growth.—By the end of 1929 over 800 cities in the United States had adopted zoning ordinances regulating, by districts, the use of buildings and, in most cases, their area, height, or both. A report of the Division of Building and Housing, U. S. Department of Commerce, dated April, 1929, and entitled "Zoned Municipalities in the United States," listed the municipalities with zoning ordinances to the beginning of 1929, and the list, with revisions bringing it through April, 1929, was published in *The American City* for June. It showed a total of 768 at that time, representing the progress from 1904, when Boston first regulated building heights, followed by Los Angeles in 1909, and various ordinances on some aspects of zoning in Monrovia and Redondo Beach, Calif. (1913), and Neenah, Wis. (1915), until 1916, when New York City adopted the first comprehensive zoning ordinance, and from then to 1929. At the end of 1916 there were eight zoned cities, and the totals at the end of each succeeding year were as follows: 1917, 12; 1918, 14; 1919, 21; 1920, 38; 1921, 76; 1922, 177; 1923, 283; 1924, 359; 1925, 469; 1926, 566; 1927, 673; 1928, 762. The Department of Commerce report states that at the beginning of 1929 more than 37,000,000 people, comprising three-fifths of the urban population of the United States, were living under the protection of zoning regulations. At that time 56 of the 68 cities having over 100,000 inhabitants, by the 1920 census, were zoned; and 1929 saw the addition of Cleveland, Dallas, Tex., New Orleans, and Spokane, Wash. The remaining zoned cities are well scattered through the population groups, including 105 places of less than 1000.

Cities Added in 1929.—Up to December, 1929, the following cities were known to have been added to the list of zoned municipalities in 1929:

- *California*
  - Corcoran
  - Montebello
  - Montecito
  - San Jose
  - South Gate
- *Colorado*
  - Fort Collins
  - Sterling
- *Florida*
  - Palm Beach
- *Georgia*
  - Brunswick
  - Waycross
- *Illinois*
  - East Moline
  - Pekin
  - Silvia
  - Zion
- *Indiana*
  - Goshen
  - Kendallville
  - Vincennes
- *Louisiana*
  - New Orleans
- *Maryland*
  - Frederick
- *Massachusetts*
  - Lincoln
  - Saugus
- *Michigan*
  - Marshall
  - Oak Park
  - St. Clair Shores
- *Missouri*
  - Cape Giradeau
  - Clayton
- *New Jersey*
  - Allendale
  - Allenhurst
  - Chatham
  - Dover
  - Hasbrouck Heights
  - Hillsdale
  - Longport
  - Morris Plains
  - Princeton
  - Red Bank
  - Rumson
  - South Orange
  - Spring Lake
  - Wyckoff
- *New York*
  - Bedford
  - Bellport
  - Irondequoit
  - North Hempstead
  - Oyster Bay
  - Peeskill
- *Ohio*
  - Cleveland
  - South Euclid
- *Pennsylvania*
  - Cheltenham
  - Collingdale
  - North Charleroi
  - Palmerton
  - Paxtang
  - Thornburg
  - Westmont
  - Wyomissing Hills
  - Yeadon
- *Texas*
  - Dallas
- *Washington*
  - Spokane

LEGISLATION AND COURT DECISIONS

State Enactments.—Besides the municipal ordinances indicated by the above list there were various cases of state legislation during the year, including a planning and zoning enabling act in Arkansas, an enabling act of the Pennsylvania Legislature applying to the city of Philadelphia, and statutes in Indiana, Minnesota and Montana, the last-named state having had no zoned cities as yet, this being true also of New Mexico, Vermont, West Virginia and Wyoming.

State Court Cases.—Courts in many states were called upon during the year to decide various questions relating to zoning. No decisions of importance in this field came down from the United States Supreme Court, however. Among decisions of some interest in state courts were one in Alabama (Longshore *v.* City of Montgomery, 119 So. 599), that "consent zoning," where issuance of a permit for a commercial building was made to depend upon the consent of neighboring property-owners, is unconstitutional;

one in California (People *v.* Hawley, 279 Pac. 148) that the prohibition by zoning ordinance of the excavation of rock, sand and gravel in a residential district is unreasonable, a Federal District Court, however, in *Marblehead Land Co. and Standard Oil Co. v. City of Los Angeles*, deciding that an ordinance establishing a residential district and prohibiting the extraction of oil therein was valid and admitted of no infringement.

Home Rule.—In Ohio (*State ex rel. Underwood v. Baurman*, Court of Appeals), the Court held that the power of the city of Akron to zone is derived from the charter and not from the state law. As to the last-mentioned, Frank B. Williams comments in his "Zoning and Planning Notes" in *The American City*, "It is without doubt the general rule that a state enabling act is necessary in order that local governments within a state may have the power to pass zoning ordinances. This case, however it may be decided on appeal, shows that this is not always true and in view of the already considerable number of home rule state constitutional amendments and statutes, which is on the increase, is especially valuable at this time. It should also be remembered that so-called home rule legislation varies greatly and must always be carefully studied to determine its effect. Not all home rule laws give the power to local governments to zone."

ZONING CLASSIFICATION

Retail Districts in New York.—New York City has added another use classification for manufacturing to the three,—residential, business and unrestricted—that were provided for in its original zoning, by the authorization of retail business districts. Nearly all other zoned cities have provided for a commercial district in addition to the three mentioned above, but as New York's zoning ordinance was the first comprehensive one in the country, complications in classifications were avoided. In the spring of 1929, however, the zoning resolution was amended to create districts for business of a retail nature only, constituting an interesting innovation. The amendment was put into practice during the year, notably in designating as a retail district a part of Park Avenue (46th to 57th Streets) that had hitherto been residential. This action strikingly emphasized the economic importance of zoning as a regulation of land use; the district in question was presented with a tremendous appreciation of land values by this change, very possibly amounting to hundreds of millions of dollars. The city government will incidentally and eventually receive a benefit, in the form of increased taxes, as well as the private owners. Civic benefits, other than the additional tax revenue, are less certain in view of New York's ultra-generous attitude toward skyscrapers, and the great congestion of traffic and transportation that prevails.

Building Heights in Chicago.—A flagrant example of tampering with height restrictions occurred during the year in Chicago, where an ordinance radically modifying height limits under certain circumstances, was slipped through the City Council, and a building permit forthwith granted thereunder, authorizing the erection of a building, to be known as the Cuneo Tower, to a height of 440 feet without setback on Michigan Avenue, and with a 217-foot tower in addition. Besides granting a special privilege to a rather narrowly limited class of property, this action would mean another considerable increment to the congestion of the Loop district. Upon being given publicity, however, this proceeding met with such strong opposition that the ordinance was repealed and the permit ordered revoked. A further check on needlessly high buildings in Chicago occurred Oct. 22, when the Illinois Supreme Court ruled that the Zoning Board had no power to authorize a permit for a 20-story apartment building, 231 feet high, in a district where the legal limit was 90 feet.

PUBLICATIONS

New Jersey Zoning Report.—The Bureau of Municipal Information of the New Jersey State League of Municipalities, Trenton, N. J., besides preparing a model zoning ordinance for use under the New Jersey zoning enabling act of 1928, has issued a report on the results of a questionnaire about the effects of zoning in New Jersey. The replies were generally favorable.

U. S. Chamber of Commerce Pamphlet.—Another publication of general interest in the field appearing during the year, is "Zoning, a Statement of Principles and Procedure," a pamphlet of the Civil Development Department of the Chamber of Commerce of the United States. This department also issued, under date of November 1, 1929, a supplement to its report that appeared early in 1928 under the title, "City Planning and Zoning Accomplishments."

CITY PLANNING

By Harland Bartholomew

City Plan and Landscape Engineer, St. Louis

PROGRESS IN CITY PLANNING

Graduate School at Harvard.—Several events of considerable significance in the field of City Planning have taken place in 1929. The first funds for technical research in this rapidly developing science have become available through the grant of approximately $250,000 by the Rockefeller Foundation to Harvard University. The fund is to be expended in seven years. With this and other funds, a graduate School of City Planning has been established and several special investigations have begun under the direction of City Planning Consultants in the fields of traffic, zoning, population densities and public recreation.

Removal of Planning Obstacles.—For the past twenty years, American cities have taken a casual but growing interest in City Planning. Widespread application of the fundamental principles of City Planning have been noticeably absent. Numerous plans have graphically portrayed the future needs of cities but the union of theory and practice has been delayed for various reasons, some legal, some political but more, perhaps, because of lack of widespread public understanding and appreciation of means and methods. The legislative mechanism having been supplied in the form of the Standard City Planning Enabling Act published by the City Planning and Zoning Advisory Committee of the Department of Commerce in 1928 and by the excellent planning laws of New York State, the year 1929 has witnessed a surprisingly strong tendency to remove the remaining obstacles that hinder effective accomplishment of city plans designed to meet the needs of the next half century. The organization of citizens' committees to promote preparation of adequate plans and to enlist public support for their adoption and enforcement is the most significant event in the field of city planning that marks the year.

Citizens' Committees.—Such cities as St. Louis and Rochester, with long records of accomplishment in city planning, have organized new Citizens' Committees to secure more effective accomplishment through better public understanding and citizen support for the official adoption of plans. Other cities, such as Louisville, initiating city planning work for the first time, have created citizens' committees to support the work of the official city plan commission and thus forestall the vitiation of plans through official inertia or opposition.

RESEARCH AND STUDY

American Planning Foundation.—To aid cities in the creation of citizen committees and to further public understanding of the significance of city planning as well as to foster more extensive research and instruction in schools and colleges, there was formed this year the American Planning Foundation composed of leading civic workers, educators, sociologists, publicists, manufacturers and representatives of various other professional groups.

The Hubbard Survey.—In further response to the need for information of practical value in this field, a most complete survey of all city planning activity in American cities was made and published by Henry V. and Theodora K. Hubbard of Harvard University and published under the title of *Our Cities of Today and Tomorrow.* This is by far the most valuable city planning publication issued in several years. It is stated that there are some 650 municipalities having official planning commissions and 754 cities with zoning ordinances.

CITY PLANNING PROJECTS

Chicago.—There have not been many physical plans of outstanding significance completed in 1929. Chicago again leads the list of cities in the progress made on lake front development and final adoption of plans for all structures to complete the Outer Drive. Plans for an extensive system of two-level streets to connect with outlying territory have been published but received a setback at the polls when the voters rejected the first of these which was to extend westward from the Loop to Oak Park.

Philadelphia has shown a renewed interest in city planning through the appointment of its first official city plan commission. While it has long possessed most effective legislation permitting the official adoption of a city plan, Philadelphia has failed to keep abreast of the times, its work having been entrusted to officials engaged in routine duties rather than to a city plan commission charged with the single duty of preparing a comprehensive plan. Here is an interesting example of the ineffectiveness of routine methods so often advocated by officials ignorant of the scientific character of modern city planning work.

New York.—Contracts have been let for the two-level street which is to be made along the west side of Manhattan Island, which, when completed, will afford the first interesting example of high speed-separated-grade-vehicular traffic ways.

St. Louis and Toledo.—The United States Government, through Postmaster General Brown, aided the construction of civic centers by placing Federal buildings therein and announcing that hereafter it would be the policy of the Federal Government, where possible, to continue this policy in cities with civic centers. In St. Louis, two additional important street-widening projects contained in the Major Street plan have been completed and opened to traffic—Vandeventer Avenue and Easton Avenue. Plans were also announced for the development of the entire river front at St. Louis.

Kenosha, Wis.—Howland Avenue, the most important crosstown street in the city has been widened throughout to 100 feet, a notable achievement indeed and a splendid example to other cities of its size.

New Orleans joined the ranks of large cities possessing comprehensive zoning ordinances.

San Francisco has announced a Federal building is to be added to its civic center group and plans have been adopted for two large additional buildings as a war memorial. Here, also, a new charter amendment has authorized the city plan commission to exercise certain powers not usually enjoyed by such bodies.

Ft. Worth, Tex.—An ordinance was adopted providing for the immediate undertaking of a 130-foot thoroughfare across the entire city connecting three sections heretofore accessible to each other only *via* the central business district, a most significant city planning project costing several million dollars.

COGNATE SOCIETIES

American Civic Assn., Union Trust Building, Washington, D. C.

American Legislators' Association, Equitable Building, Denver, Col.

American Municipal Association, Lawrence, Kansas.

American Society for Municipal Improvements, 3817 Olive St., St. Louis, Mo.

Better Government League, Washington, D. C.

Governmental Research Assn., 261 Broadway, New York, N. Y.

International City Managers Assn., University of Chicago, Chicago.

National Civil Service Reform League, 519 Fifth Avenue, New York City.

National Institute of Public Administration, 261 Broadway, New York City.

National Municipal League, 261 Broadway, New York, N. Y.

DIVISION VI

TERRITORIES AND SPHERES OF INFLUENCE

ALASKA AND HAWAII

By Francis LeJau Parker

Brigadier General U. S. A.; Chief, Bureau of Insular Affairs, War Department

---

ECONOMIC CONDITIONS IN ALASKA

Commerce.—Governor Parks reports that the outstanding feature of the year from an economic viewpoint was the remarkable improvement in the production of salmon fisheries, which was the result of regulatory measures adopted during the previous seasons. There was a gratifying increase over 1927 in the value of commodities produced in and shipped from the Territory. The total value of exports is $74,849,918, or $17,288,271 more than for the previous year. Imports were valued at $32,636,833, or $3,739,537 less than 1927. The balance of trade in favor of Alaska is $42,213,085, as compared with $20,566,605 for last year, an increase of more than 50 per cent, almost entirely due to the large salmon pack.

Industries.—The major industries are fishing and mining, and the combined value of the products from these sources for 1928 shows an increase of about 25 per cent over that of 1927. The fishing and mining industries absorb about 96 per cent of the labor employed in the Territory and, of this, the fisheries account for 84 per cent. The railroads, road-building agencies, and logging concerns are the only other large employers of labor. The mining industry has been stimulated during the past year by new developments and by assistance given to prospectors. Alaska contains large quantities of limestone and a quarry, situated on Dall Island, about 50 miles west of Ketchikan, having a capacity of several thousand tons per day, was opened during the year for the production of limestone to supply a cement plant near Seattle. There are large deposits of excellent marble in southeastern Alaska and excellent opportunity for the production of marble at a minimum expense. Dairying in some of the valleys along the Alaska Railroad between the cities of Seward and Fairbanks has become an important industry. The national forests of Alaska embrace an area of approximately 21,000,000 acres. They comprise 13% of the total forest reserves of the United States and contain about 85,000,000,000 board feet of timber. It is estimated that the forests will yield 1,000,000,000 board feet each year and that the present yearly cut is but 5.6% of what can be taken without danger of depleting the supply. Much of the timber is valuable for the manufacture of pulp and paper. The actual construction of one or more paper mills will be undertaken in the near future. It is estimated that 1,300,000 tons of newsprint may be manufactured each year without injury to the forests.

Fisheries.—The salmon catch in 1928 shows an increase of approximately 86% over 1927. This is accounted for primarily by the large runs of red salmon in western Alaska and pink salmon in the southeastern district. The salmon catch is secured almost wholly by means of traps, seines and gill nets. The value of the canned salmon in 1928 represents about 96% of the total value of the industry. An appreciable number are prepared for market by pickling, freezing, drying, and salting. The production of the herring industry was somewhat greater than in 1927. An important feature was the discovery of large schools of herring in the vicinity of Dutch Harbor. The halibut industry suffered a decline in prices and in quantity of fish caught: the output from the cod fisheries declined about 50% under last year. There was a sharp decline in the whaling industry, an increase in the output of shrimps and crabs, and a sharp decline in the production of clams.

Furs.—The total number of seals in the herd on the Pribilof Islands on Aug. 10, 1928, was 871,513, an increase of 7.7%. During 1928, 31,099 sealskins were taken from the Pribilof Islands herds, and 28,929 of them were sold at public auction and at private sales, for a total of $896,383.40. White and blue fox skins were sold at public auction for $21,290. The value of the land fur-bearing animal pelts shipped from the Territory during the calendar year 1928 was $4,277,347.13, an increase of $617,406.45 over the year 1927. Wolves and coyotes are increasing rapidly and are destroying small game and fur-bearers. The Territory is spending $15,000 a year in an effort to control the advance of these animals, but these funds are inadequate, and the Government asks the assistance of the Federal Government.

Reindeer.—The general reindeer superintendent, whose appointment was provided by Congress last year, has established his headquarters at Nome. This industry has developed in a remarkable way. More deer have been slaughtered and shipped than ever before. There is an increasing demand for hides, hair, and antlers. The number of reindeer on June 30, 1929, was 599,825, of which 9,394 were owned by the Government.

Mining.—Gold and copper are the chief sources of mineral wealth. It is interesting to note that approximately $600,000,000 has been produced from the mines in Alaska since 1880. Since 1916 there has been a gradual decline in the mineral output. In 1928 the total value of all mineral products is reported to be $14,128,000. This is $176,000 under the 1927 valuation. The decline is due wholly to the decrease in the quantity and value of copper that was mined. The gold production increased very materially: it is estimated to be worth $6,775,000, as compared with $5,927,000 in 1927. There has been a steady decline in the production of copper each year since 1923, and further decrease is inevitable unless new ore deposits are discovered. As approximately 75% of the silver produced is recovered from the copper ores, the decline in copper production is accompanied by a decrease in the output of silver. The coal mine production is 20% greater than last year and exceeds the production of any previous year. An increase is noted in the production of lead, marble, limestone, tin and platinum.

Finances.—The Territory has its own fiscal system controlled by laws enacted by the Territorial Legislature, which is entirely separate and apart from the revenues received by the Federal Government from business and trade licenses and which are covered into and disbursed from the Alaska fund in the Federal Treasury. The balance in the Territorial treasury on June 30, 1929, was $1,059,153.51. Federal income-tax collections increased 5% over 1927. An increase of more than $500,000 in bank deposits is significant of the improved economic conditions.

EDUCATION

The schools of Alaska are supported by the Federal Government by direct appropriation and by the Territorial Government from Territorial revenues. The Federal Government, through the Bureau of Education, with headquarters in Seattle, supervises the education, medical relief, industrial training, reindeer husbandry, and relief of destitution among the natives in Alaska. During the year 97 schools for the natives, with an enrollment of 3,832 pupils, employed 177 teachers. The native population is estimated to be about 27,000 and is scattered over an area about one-fifth that of the United States. It is difficult to provide adequate school facilities where the population is so scattered, and present appropriations are not sufficient. The Territorial public schools, which are maintained for white children and children of mixed blood leading a civilized life, are under the supervision of the Territorial commissioner of education, with headquarters in Juneau. During the last year 15 public high schools and 89 elementary schools were maintained: 235 teachers were employed for 5,032 pupils, at a cost of $541,772.09. Six citizenship night schools are maintained for the benefit of adult residents who have not had an opportunity to acquire an education or are unfamiliar with the American Government.

TRANSPORTATION

Railroads.—The revenues derived from transportation of freight and passengers over the Alaska Railroad decreased: the total deficit amounted to $950,711.74. Shipments of coal increased 16%, but this was not sufficient to overcome the decline in shipments of machinery and construction supplies. There was a gratifying increase in the tourist travel.

Roads and Trails.—The Alaska Road Commission was the first organized road-building unit in the Territory, and since its inception has expended $14,799,171.51 and constructed 7,164¼ miles of roads, trails and tramways. In 1928 the new construction consisted of 45 miles of road, 48½ miles of sled road, 104 miles of trail, 440 linear feet of bridges, 10 airplane landing fields, and 23 shelter cabins. River and harbor improvements and the construction of lighthouses and other aids to navigation are in charge of the president of the Alaska Road Commission. The last Legislature adopted a resolution favoring the construction of an international highway that will connect Alaska and the United States.

Aviation has assumed an important place in the transportation field in the Territory, and Alaska occupies a strategic position in the proposed air routes between Asia and America. Commercial aviation in Alaska began about seven years ago. Since that date rapid progress has been made. The Territorial Government expends annually 30 per cent of the road appropriation for the construction of landing fields, and there are at present 67 fields situated in strategic places in the interior of the Territory.

HAWAII

Government.—Governor Wallace R. Farrington's term of office expired July 5, 1929. He was succeeded by Lawrence M. Judd. The fifteenth legislature was held from February to May, 1929. Among the important measures passed was one creating a tax board and providing for an appraisal of all the taxable property in the Territory and an economic study of the tax laws.

Capt. Cook Anniversary.—One of the outstanding events of the year was the celebration in August, 1928, commemorating the 150th anniversary of the discovery of the Hawaiian Islands by Capt. James N. Cook, R.N. Three men-of-war of the British Navy and delegates representing the Governments of Great Britain, Australia, and New Zealand, respectively, took part in the ceremonies. The Dominion of Canada also sent a delegate. The President of the United States was represented by Dwight F. Davis, then Secretary of War.

Population.—The total estimated population June 30, 1929, was 357,649, an increase of 8,882 over last year and of 33.4% during the last ten years. In American citizenship the population increased this year by 8,301 and aliens by 581, the entire population being composed of 236,577 citizens and 121,072 aliens. The racial classification is given at the top of page 130.

Finances.—The total bonded debt on June 30, 1928, was $28,585,000, which was increased by $1,175,000 Feb. 1, 1929. The Territorial taxes collected totaled $15,209,175.92. The gross assessable value of real and personal property is $414,972,056. Internal-revenue payments to the Federal Treasury, while not as large as previous years, nevertheless were greater

	Total	Race							
		Caucasian	Hawaiian	Part Hawaiian	Filipino	Japanese	Chinese	Korean	Others
Citizens	236,577	72,238	20,479	27,285	9,176	87,748	15,625	3,643	383
Alien	121,072	4,259	.....	.....	54,693*	49,659	9,586	2,750	125

* Nationals.

than the payments made by the Territory of Alaska and 14 States of the Union. The net amount of money paid into the Treasury since 1900 is $106,816,664.82. Thirty-one banks and eleven trust companies were in operation at the close of the year. The total bank deposits are $79,038,619.25, of which $35,424,194.59 is in savings banks.

TRANSPORTATION IN HAWAII

Railway and Street Transit.—There are steam railroads on all islands, operating on regular schedule, most of them carrying passengers. In addition, plantations have their private railway equipment for transporting cane and laborers. There is only one street railway system and bus service.

Tourist Trade.—All previous records for tourist travel to Hawaii were broken during 1928. There were 19,980 non-resident passengers to the Hawaiian Islands, a gain of nearly 15% over 1927. It is estimated that the 1928 tourist trade was worth $10,000,000 to Hawaii.

Aviation.—The past year witnessed the inauguration of commercial aviation in Hawaii on a larger scale than any such previous period. Several new concerns were organized and incorporated to conduct flying activities within the Territory. Airport development is progressing satisfactorily.

EDUCATION AND HEALTH

Public Schools.—The school year 1928-1929 has been one of steady growth and constructive progress. The enrollment has increased approximately 7%—from 66,434 in June, 1928, to 70,232 in June, 1929—and the teaching staff from 2,298 to 2,485. During the past ten years the teaching staff has increased almost 150%.

University of Hawaii.—The year has been one of progress for the University. A plan for the amalgamation of the Federal Experiment Station with the University has been worked out with the U. S. Department of Agriculture, to go into effect July 1, 1929. The agricultural extension service has been thoroughly organized and is functioning well.

Health conditions were not as favorable as in some previous years, the birth rate being slightly lower, the death rate higher, and an appreciable increase in infant mortality. The birth rate was 32.55 per 1,000 population, as compared with 33.84 for 1928; the death rate was 16.52, as compared with 11.70 for 1928. The increase in deaths was principally due to influenza, whooping cough, and meningococcus meningitis. Decreases were noted for typhoid, trachoma, and tuberculosis.

ECONOMIC CONDITIONS

Exports and Imports.—Exports increased by $7,975,800, reaching a total of $119,479,835, the highest total ever reached since 1921. Imports were slightly less than during the preceding year.

Sugar.—The output of sugar for the crop period ended Sept. 30, 1928, is the largest on record—897,396 tons—an increase of about 10% over 1927. The propitious weather conditions have been the biggest factor in increased production, and there has been but little increase in the area planted in sugar-cane.

Pineapples and Coffee.—The second industry, the production of pineapples, shows a big increase, the value exported amounting to approximately $40,871,581, an increase of nearly $6,000,000 over 1927. The acreage devoted to coffee production is about

6,000 acres. The value of the coffee exported during 1928 was $1,368,826, the crop amounting to 5,151,266 pounds.

Livestock.—Production of livestock has long been a big factor in the commercial and industrial life of the people of Hawaii. The livestock is conservatively valued at $11,600,000. There are 41 cattle ranches of importance, having a total of approximately 108,800 heads of cattle. About 1,330,000 acres of land are devoted to the cattle industry.

DOMESTIC EXPORTS OF HAWAII

(Calendar Years 1927 and 1928)

Articles	United States 1928	Foreign 1928	Total 1928	Total 1927
Sugar	$ 72,035,820	$ 6	$ 72,035,826	$ 69,827,821
Coffee	982,731	386,095	1,368,826	1,779,809
Fruits and nuts *	39,594,090	1,277,491	40,871,581	34,934,087
Rice	14,830	—	14,830	8,051
Hides	237,507	—	237,507	170,034
U. S. goods returned	2,786,204	—	2,786,204	2,832,300
Other †	1,289,644	851,039	2,140,683	1,899,549
Total	$116,940,826	$2,514,631	$119,455,457	$111,286,617

* Mostly pineapples.
† Mostly sugar-mill machinery.

PORTO RICO

By Francis LeJau Parker

Brigadier General, U.S.A.; Chief, Bureau of Insular Affairs, War Department

THE HURRICANE

Effects of Catastrophe.—The year was signalized by the widespread and disastrous effects of the violent hurricane which visited the Island Sept. 13, 1928. The Governor reported that socially, economically, politically, educationally, in their health and by its psychological influences, its people have been greatly affected by that event.

Relief Activities.—Immediately following the storm, the Governor directed his attention to relief and rehabilitation. Heads of all Insular Departments were called into conference; an Insular Executive Committee of Supervision and Relief was at once elected; the War Department was asked to send relief as soon as possible, and the President of the United States was requested to issue a proclamation asking for financial aid. As soon as it was realized that the losses were beyond the resources of the Island, even with the generous help of the Red Cross, and realizing that an appeal would have to be made to Congress, the Governor organized the Central Survey Committee to make a careful survey of the losses. (For the report of that committee see The American Year Book for 1928.)

The War Department aided in a most effective manner. It made immediately available tents, medical supplies, blankets, cots and 1,000 tons of subsistence and clothing. Army officers and nurses were sent, with instructions to aid the Governor in every possible way. Contributions of over $3,100,000 resulted from the President's proclamation. A few days after the hurricane, representatives of the Red Cross from the United States reached San Juan and continued the relief work already begun there with the aid of the local Chapter. For a time, it cost $30,000 a day to distribute over the Island sufficient food to prevent hunger and possible starvation. The amount expended by the American Red Cross for relief work was $3,150,288.16.

Losses and Damage.—The loss of life was small, being only 258 out of a population estimated at 1,472,755. The persons injured were reported to be 3,051. More than 500,000 of the people were left absolutely destitute and without food. The material damage was enormous, estimated at over $85,000,000. Insular and municipal buildings, roads, bridges, the telegraph and telephone service, irrigation works and other public utilities were damaged in varying degree. The Governor makes the following summary:

> "All parts of the Island suffered. Hardly a building of any kind was uninjured. When the tempestuous winds had subsided and the torrential rain had ceased, all frail structures, the homes of the dwellers on the mountainsides, were found destroyed. Of thousands of these homes of the people not a vestige remained. In city and country alike the storm left its destructive mark. Sugar centrals, large manufactories costing millions of dollars, were left a shapeless mass of débris. School houses were destroyed or unroofed. As a result, it is literally true that 500,000 people were left homeless, without food or clothing except those they had worn throughout the storm."

Action by Congress.—An Act of Congress approved December 21, 1928, created the Porto Rican Hurricane Relief Commission, consisting of the Secretary of War, the Secretary of the Treasury, and the Secretary of Agriculture, and authorized appropriations totaling $8,150,000, $5,150,000 to be available the first year, $2,000,000 the second year, and $1,000,000 the third year. Much has already been accomplished in the way of making loans to individual agriculturists, purchasing and distributing seeds, repairing roads and schoolhouses, and other damage done.

Election.—The quadrennial general election was held on November 6, 1928. There were 359,278 qualified electors registered.

ECONOMIC CONDITIONS AND PROBLEMS

External Trade.—As concrete evidence of the effects of the hurricane upon commerce, the Governor gives the following table:

	1900	1928	1929
Imports from U. S.	$ 6,952,114	$ 79,743,088	$ 85,078,596
Exports to U. S.	3,350,577	96,662,619	76,418,210
Imports from foreign countries	3,037,391	12,599,241	12,782,164
Exports to foreign countries	3,261,922	6,872,120	5,304,660
Total	$16,602,004	$195,877,068	$179,583,630

Exports.—This shows that the external trade decreased $16,293,438. The total exports declined from $103,500,000 to $81,723,000. Decreases were shown in the value of all the principal products produced in Porto Rico. The production of sugar was 586,760 short tons—21.6% less than the crop of the preceding year and the amount exported dropped in value from $54,579,000 in 1928 to $35,222,162. The ten-million-dollar coffee crop, the largest that had been produced in Porto Rico for years, just ripened for the harvest, was almost entirely destroyed by the storm. Coffee exports dropped from $2,596,572 in 1928 to $456,831. Exports of tobacco and tobacco manufactures decreased from $20,778,000 to $16,814,454, and of fruits, from $7,539,000 in 1928 to $3,115,500. Pineapples constituted the only item which showed an increase. The value of oranges exported was the smallest ever recorded; that of canned fruits was the lowest within the last five years; coconuts and grapefruit (which show the largest decrease) had not fallen so low in value since 1911.

Imports increased from $92,342,329 to $97,860,760. The money value of the importation of wood and wood manufactures ($6,305,923) represents an increase of $2,698,345 over that of last year. Other items showing increases included coffee, cotton manufactures, cigarettes, vegetables, rice, corn meal, gasoline and sugar cane.

Labor.—The population of Porto Rico is dense, more than 400 to the square mile. The productive activities are mainly agricultural. As the labor of the Island is principally associated with agricultural interests, the conditions resulting from the hurricane have had a great effect upon labor. The work of reconstruction and rehabilitation, however, has caused a large demand for labor, which will continue for a time. The sum appropriated for road repairs provided work for 14,350 men within the last three months of the fiscal year. Emigration to the United States continued throughout the year. Of a total of 17,369 persons who left for continental United States, only 6,458 came back to the Island.

Industries.—More industries are needed, but it is difficult to induce the larger manufacturing establishments to locate plants in Porto Rico, largely because of the lack of fuel. Wood-using industries have practically disappeared, and general agriculture is greatly hampered by lack of a cheap and local supply of wood. Porto Rico is handicapped because it has neither coal nor oil.

Unused Lands.—The Governor calls attention to the fact that there now exist more than 1,000,000 acres (or nearly one-half the entire land area of the Island) of relatively unproductive land suited for crop-producing, timber culture, and pasture. The Governor feels that the limit of Porto Rico's capacity for agricultural production has not been reached and recommends an extension of coffee plantations, the establishment of cultural forests, the improvement of grasses, and other activities tending to increase the productive wealth of Porto Rico. He regards the presence of this immense area of unproductive land as an important, perhaps a vital, economic and social factor.

FINANCES

The consequences of the hurricane were, naturally, reflected in governmental revenues. The cash receipts were reduced from $12,446,219.13 in 1928 (which was the largest ever collected in Porto Rico) to $11,004,138.52. Receipts from the income tax increased over $900,000, while those from the excise and sales tax were greatly reduced. During the year, a new issue of $320,000 was made for the San Juan Harbor Board. Bond redemptions were made during the year in the amount of $552,000. The total bonded debt of the Porto Rican Government on June 30 was $25,285,000, a reduction of $232,000 from 1928; and that of the Municipalities, $18,386,300. The floating debt was increased by temporary hurricane loans amounting to $1,002,950, and on June 30, 1929, amounted to $2,486,010.97. Payments during the year amounted to $462,772.25, the net increase being $540,177.75.

PUBLIC WORKS

Public Buildings.—Practically all plans for new buildings were abandoned, and the building activities of the Department of the Interior were devoted to the repair of structures damaged by the hurricane and the preparation of plans for the construction of new buildings to replace those destroyed.

Roads and Irrigation.—The amount expended for maintenance and repairs, $1,593,872.52, was the largest ever spent in any one year for that purpose. In addition to the repair work, 80.4 kilometers of new roads, including all bridging, was completed, and there were constructed 12 new bridges of over ten-meter span. It is interesting to note that the amount of hard-surfaced roads constructed by the Spanish Government during nearly four centuries was about 172 miles; and during the thirty years of American occupancy, nearly 1,000 miles. The Isabela Irrigation System was practically completed by December. The irrigable acreage was increased during the year from 6,926 acres to 11,311 acres. The amount of crops grown under irrigation during the year was: sugar cane, 3,860 acres; corn, 890 acres; tobacco, 817; cotton, 619. Other crops raised the total to 7,339 acres.

EDUCATION

The work of both Spanish and English continues to be emphasized. The entire work of the school courses is bilingual. The total enrollment in public schools was 220,634; in private schools, 8,879. In the public schools, the average daily attendance was 186,551; the number of teachers, 4,498. The schools were conducted in 2,238 school buildings, with 4,602 schoolrooms. Of the Government-owned schoolhouses, hundreds were totally or partially destroyed by the storm; and this destruction extended to a large part of the school furniture, textbooks, and similar equipment. The total expenditures by the Insular Government for educational purposes for the year was $4,191,-657.09. In addition, the local Municipalities disbursed $1,625,785.16. The total enrollment in the University of Porto Rico was 3,493. During the year a gift of $10,000 was made to the School of Tropical Medicine, a part of the University under the auspices of Columbia University.

HEALTH CONDITIONS

The satisfactory condition existing at the close of the fiscal year 1927-8 continued up to the date of the hurricane, when the change was immediate. Preventive measures were taken so effectively that there were no serious epidemics and thousands of lives were saved, but, due to lack of shelter and food, there was a necessary increase in mortality. The actual number of deaths registered was 40,890, an increase of 11,208 during the year, reported to be exclusively due to the storm. The death rate increased from 20.4 per 1,000 population in 1927-8 to 27.7, an increase of 7.3 over the preceding year, and the highest recorded since the influenza epidemic of 1918-19. Infant mortality rose to 179 per 1,000, the highest recorded since 1916.

DISTRICT OF COLUMBIA

By W. Reed West

Associate Professor, George Washington University

SETTLEMENT OF CLAIMS AND SUITS

New Power Vested in Commissioners.—The Commissioners of the District of Columbia were given power in an Act, approved Feb. 11, 1929 (70th Cong., 2nd Sess., 1928-1929, Public, Chap. 173) to settle claims and suits against the District and to grant relief in claims for refund of taxes or assessments where the courts have held similar assessments invalid. A limit of $5,000 is fixed for each settlement, and a report must be made to Congress. This legislation was made necessary by the fact that the Commissioners have been held by the United States Supreme Court not to possess power to enter into compromise agreements upon claims against the District (District of Columbia *v.* Bailey, 171 U.S. 161), and upon the basis of other court decisions were believed by the Corporation Counsel not to have power to release claims for taxes and assessments of the District against individuals. In his statement the Corporation Counsel said that the District of Columbia, "unlike any other municipal corporation in the United States, has no implied municipal functions or powers by reason of the fact that the Commissioners of the District of Columbia are merely ministerial officers enjoying no rights and exercising no municipal powers except such as are conferred upon them by acts of Congress."

Advantages of Settlement Act.—Without power in the Commissioners to compromise, the District was forced into litigation upon claims against it when the resulting judgment was for a sum far in excess of the amount that would have been accepted as a compromise. In other cases, especially those involving taxes and assessments, the District was necessarily involved in litigation when, under previous decisions in similar cases, it was a foregone conclusion that the suit would go against the District. The Corporation Counsel reported that of some fifty such cases pending in the local courts, about forty were totally indefensible. A peculiarity of judgments against the District lies in the fact that in reality they amount to nothing more than a recommendation to Congress to appropriate the funds. The legality of the Commissioners' consent to such judgments is not upheld by specific enactment but only by the implied sanction of Congress from its invariable practice of making the necessary appropriations. The newly granted power in the Commissioners to compromise will relieve Congress of the necessity of going into these details.

ASSESSMENT AND TAX COLLECTION

Sale for Non-Payment of Taxes.—An Act, approved Feb. 14, 1929 (70th Cong., 2nd Sess., 1928-1929, Public, Chap. 197) provides that, after more than two years has elapsed after the District has bid in property for non-payment of taxes, the Commissioners may apply for a court order for public sale, notice to defendants by publication being permissible. It is believed that deeds issued under this procedure will be stronger than those issued under the old law, with the result that properties can now be sold when, previously, no bidders appeared.

Changes in Methods.—An Act, approved February 18, 1929 (70th Cong., 2nd Sess., 1928-1929, Public, Chap. 259) made several changes in the methods of assessment and collection of taxes upon personal property. It provides the same remedies for the collection of intangible personal property taxes as were granted in the Act of 1902 for tangible personal property, in addition to common law and equitable remedies. There had been some doubt as to whether these remedies were made permissible in the existing law. It was also made permissible to sell real property by court order, where such property has been levied upon for non-payment of personal taxes and the best price at auction is not sufficient. The date for the filing of personal tax returns except those upon automobiles is changed to July of the tax year upon a valuation of July 1 of that year, except in the case of the stock of merchants. A more important provision permits the Commissioners to secure a mandamus from the District Supreme Court to compel the filing of a personal tax return. The old law merely gave the assessor power to make an assessment upon the basis of the best available information, adding 20 per cent for penalty. It had proved inadequate. About 45,000 voluntary returns are made each year in a population of over 500,000. The new law applies the tax to all persons with a place of abode in the District on July 1 and three months prior thereto unless the tax is paid elsewhere. Cabinet officers and persons elected for definite terms are excepted. The old law had used six months instead of three as the period of abode. Automobiles will hereafter be taxed as personal property independently, the personal property assessment being upon a calendar year basis, and payment being made before a tag is issued. Under the old law, returns were made in March for the tax year beginning the following July 1, with no possibility of enforcing collection until the close of the tax year.

BOARD OF EDUCATION

Personal Liability Relief.—In an Act, approved January 26, 1929 (70th Cong., 2nd Sess., 1928-1929, Public, Chap. 105) the members of the Board of Education were relieved of personal liability in damages for official actions of the Board performed in good faith. In the past, members of the Board have been subject to suit in such cases, and while the District eventually paid the judgments and costs, there was meantime a cloud upon the title to property of individual members of the Board.

REGULATION OF MEDICAL PRACTICE

New Provision for Examination.—An Act, approved Feb. 27, 1929 (70th Cong., 2nd Sess., 1928-1929, Public, Chap. 352) regulates the practice of the healing art in the District of Columbia. The legislation was made necessary by the fact that the medical practice act of 1896 did not define the practice of medicine and surgery, and a court decision had held that persons who did not prescribe medicine or employ surgery were not subject to its regulations. Another contributing cause was the lax incorporation laws of the District, which are dealt with in an Act discussed under the heading "Degree-Conferring Institutions." As a result the District had become a haven for charlatans. If Congress had attempted to deal with each school of healing separately the machinery of regulation would have been unnecessarily complicated and new Acts would have been necessary for each new school that arose. A "partial list" submitted by Joseph S. Wall, representing the Medical Society of the District of Columbia, named forty-five sects or cults which have developed in recent years. The present legislation follows the type of Act in force in Wisconsin, Washington, Connecticut, Nebraska and Minnesota. It provides for examinations in the basic sciences of anatomy, physiology, chemistry, bacteriology and pathology for all applicants to practice the healing art. Following this is an examination in the particular method of healing which the applicant intends to practice.

Boards of Examiners and Procedure.—The various boards of examiners are to be appointed by a commission on licensure, which also is authorized to provide general regulations. Applicants must furnish proof of good moral character, two years of preprofessional college work and four years of professional training in school except that certain exemptions may be made for those graduating before Dec. 31, 1935. Licenses will be granted without examination upon the basis of years of practice in the District or elsewhere, and through reciprocity relations between the District and the states. Persons who treat ailments by spiritual means are exempted. Examinations and qualifications also are provided for applicants for the practice of midwifery. It is expected that this Act will provide considerable protection against charlatans and will insure that persons who practice the healing art will be able to recognize communicable diseases.

Trained Nurses.—An Act, approved March 2, 1929 (70th Cong., 2nd Sess., 1928-1929, Public, Chap. 540) prevents misrepresentation by the use of the terms "certified graduate, or trained nurse" by others than graduates of training schools of approved standards and who have been examined and registered. Annual reregistration of both registered nurses and training schools is provided for and some other changes are made in existing law.

THE "DIPLOMA MILL"

Degree-conferring Institutions.—A matter of considerable general interest has been the "diploma mill" situation in the District of Columbia. Because of the small fee and easy requirements of the incorporation laws of the District in their relation to educational institutions many "colleges" and "universities" dispensing a great variety of degrees had been brought into existence either for the purpose of operating here or in the states. Incorporation in the District was made doubly valuable by the fact that this usually formed the basis for a claim that the institution was incorporated by authority of the United States government with the implication that it was under Federal supervision. Disreputable institutions in great number were conferring degrees by correspondence, which involved little more than the sale of the degree. Where "medical" degrees were granted there was an added danger to the public health. Foreign countries offered an excellent field for the sale of these American diplomas. Miss M. Pearl McCall, Assistant United States Attorney, reported that practically every country in Europe had made diplomatic protest.

Provisions of Incorporation Act.—To correct this evil an Act, approved March 2, 1929, (70th Cong., 2nd Sess., 1928-1929, Public, Chap. 523) provides for a fee of $25 for incorporation of a degree-conferring institution; requires a license from the Board of Education for all institutions except those incorporated by special Act of Congress; requires that applicants for licenses be of good moral character and of proper qualifications; places certain restrictions upon correspondence work; provides for revocation of licenses in case of violation of the Act, with appeal to the courts, and prohibits the use of names or phraseology that would imply a connection with the United States Government. Penalties are provided for violation of the Act.

ACQUISITION OF LAND

Park Property.—A change in policy in the acquisition of park lands appears in an Act, approved Dec. 22, 1928 (70th Cong., 2nd Sess., 1928-1929, Public, Chap. 48) which gives to the National Capital Park and Planning Commission power not only to acquire a full fee simple title in lands as heretofore, but also to acquire a title subject to limited rights of the grantor, and also power to acquire permanent rights in lands adjoining park property sufficient to prevent the use of such lands in ways that would impair the value of the park property. The leasing of buildings on park property also is authorized. This legislation is in accord with the policy of Massachusetts and some other states. Frederick Law Olmsted of the Commission appeared before the House committee in support of the bill. It makes it possible for the Commission to acquire lands where the owners have offered them for a low price and sometimes for a merely nominal consideration provided that for a limited time, as for the life of the grantor or his wife, the use of the property can be retained. It also makes it possible to protect the park property by the purchase of rights in adjoining lands to prevent destruction of trees, closing of open streams and the like. Sometimes such rights can be acquired for a small price.

New Condemnation Procedure.—In order to expedite the acquisition of land in the District for the use of the United States an Act, approved March 1, 1929 (70th Cong., 2nd Sess., 1928-1929, Public, Chap. 416) provides a method by which the United States in condemnation proceedings can, through a declaration of taking, acquire absolute title in the property upon deposit of the amount of the estimated just compensation for the land. The following proceedings will determine whether any further sums are due from the United States and if so determined a judgment will be entered against the United States. Under the former law the proceedings were held before three commissioners without a judge. Objections to evidence were offered and argued, continuances taken for weeks at a time in order to secure the attendance of a judge to decide the legal points, arguments were duplicated before the judge, new objections perhaps made after the retirement of the judge, and long adjournments taken, and after the evidence was closed it might be months before a decision was handed down. The new procedure provides for a jury of five with the judge constantly in attendance. It is expected that proceedings now will continue constantly from day to day, with prompt decision of legal questions, and an award without delay after the evidence is in. Future evaluations will not include new improvements the purpose or natural effect of which will substantially enhance the value of the land. Where owners cut trees or make other alterations, as has been done in the past, with the purpose of making it less desirable to the government, the new plan provides a procedure for deducting from the compensation. This Act applies only to condemnation proceedings by the United States and does not affect those on behalf of the District of Columbia, but another Act, approved March 1, 1929 (70th Cong., 2nd Sess., 1928-1929, Public, Chap. 439) accomplishes in part the same results to the extent that it provides that proceedings by the District in the future shall be held before judge and jury.

MUNICIPAL CENTER IN WASHINGTON

An Act, approved Feb. 28, 1929 (70th Cong., 2nd Sess., 1928-1929, Public, Chap. 379) authorizes the purchase of an area for a municipal center and the erection of the necessary buildings thereon. This area consists of a number of blocks lying on the north side of Pennsylvania Avenue.

MINOR ACTS

Sanitorium for Tuberculous Children.—An Act, approved March 1, 1929 (70th Cong., 2nd Sess., 1928-1929, Public, Chap. 422) authorized the appropriation of $500,000 to establish a children's tuberculosis sanitorium for the District. Washington had no sanitorium for tuberculosis children. A city ordinance prevents the admission of tuberculous patients to a general hospital, the Municipal Tuberculosis Hospital does not admit children under fourteen years of age, and the two tuberculosis schools are intended only for children of school age who are not sick enough to be in a sanitorium.

Miscellaneous.—Other Acts authorize the acquisition of a site for a new farmers' market and construction of the necessary physical equipment, the construction of two incinerators care for the combustible refuse of t District, and the construction of n over six public bathing pools beaches. An Act, approved Decemb 20, 1928 (70th Cong., 2nd Sess., 192 1929, Public, Chap. 40) extends t classes of beneficiaries who may r ceive death benefits of fraternal ben ficial associations. A "rider" in t District appropriation bill remov the preference in appointments to th District schools of graduates of th two District normal schools and au thorized the expansion of the norma schools into teachers' colleges wit power to award degrees for the pu pose of teaching upon completion of four years course.

THE PHILIPPINE ISLANDS

BY FRANCIS LEJAU PARKER

BRIGADIER GENERAL, U. S. A.; CHIEF, BUREAU OF INSULAR AFFAIRS, WAR DEPARTMENT

GENERAL

General Conditions.—Governor General Stimson left Manila Feb. 23, 1929, in order to take up his duties at Washington as Secretary of State. His report represents a review of his year's work in the Philippine Islands. In it he states: "In general, the year has been a fairly prosperous and satisfactory one, with the single exception of the typhoon . . . Public order has been excellent, health conditions have been good, government finances are in a sound condition and the general prosperity of the people is evident."

The typhoon began Nov. 23 and exceeded in destructiveness almost all of the typhoons which have visited the Islands since the American occupation. Its principal damage was in Samar, Northern Leyte, Sorsogon, Albay, and Masbate, but further serious damage was done in at least twelve other provinces. Over five hundred lives were lost, over 25,000 homes were totally or partially destroyed, and more than $250,000 of damage was done to public works alone.

GOVERNMENT POLICIES AND ACTS

Governor Stimson's Administration.—The accomplishments which Governor Stimson believes to be the outstanding features of his one year's administration are: (1) The establishment of certain governmental machinery of coöperation, the choice of a Cabinet from the party in control of the Legislature, the appointment of a Council of State advisory in character, the securing of needed advisers and assistants to the Governor General, and the amendment of rules of procedure of the two houses of the Legislature (see AMERICAN YEAR BOOK, 1928), which succeeded in satisfying the Filipino anxiety that the promised development in Filipino autonomy had not been overlooked, but was going ahead; (2) The impetus given toward the mental change on the part of the people, who have come to consider, almost for the first time, the industrial and economic foundations of their political problems, and (3) The cessation of the period of deadlock between the American executive and the Philippine Legislature and the substitution therefor of a period of recognized coöperation and friendly feeling between Americans and Filipinos.

The Cabinet System.—Referring to the four steps adopted for the creation of the governmental machinery, Governor Stimson says that the success which they met has greatly strengthened his views upon the proper method of the ultimate solution of the Philippine problem, and sums up his opinion as follows:

> "I now believe more firmly than ever that under the provisions of the present Organic Act of 1916, there is sufficient flexibility for the working out of Filipino autonomy through the development of a responsible cabinet system which will be both satisfactory to the natural Filipino desire for such administrative autonomy and which, at the same time, will preserve the safeguards against possible mistakes and setbacks which may come in that process. I believe that such a system worked out by the method of administrative evolution under the present law will be far more efficient, satisfactory and safe than any which is likely to be attained through legislation passed by an American Congress, which necessarily is imperfectly informed as to Philippine conditions. It will have the inevitable advantage which is possessed in all human affairs by the method of gradual evolution by trial and error over any attempt to create at once and for all time a complete system by statute."

LEGISLATION

Corporation Law Amendments.—The feature of the regular legislative session was the discussion on the amendments of the Corporation Law, which made important changes in the government of corporations, provided for the authorization of no par stock and stock dividends and, most important of all, repealed certain enactments which forbade any investor to be interested in more than one agricultural corporation. The debate opened up the question of the development of the Islands by outside capital, their relations to America, the land policy of the Islands, and the relation of capital to labor and to the government. The law was passed on Dec. 3, 1928, and opened the door for the formation of investment companies in the principal industry of the Islands. One of the promising results noted just before Governor Stimson's departure from Manila was a business man's congress at which important economic and business questions were discussed for nearly a week.

Bank Law and other Amendments.—During the special session, called on February 7th to provide money for constructive relief measures made necessary by the typhoon, four bills were passed reorganizing the system of bank inspection and in other respects safeguarding the business of banking and bringing it up to modern conditions, and important amendments were made to the insular irrigation law, the insular gasoline tax law and to several other statutes. The Governor General felt that the legislation passed at these two sessions would constitute an extremely creditable, and even exceptional, record for any state legislature in the United States.

Miscellaneous Measures.—Other measures were passed having a direct bearing upon the economic development of the Islands, including certain amendments to the land law. A very important bill with reference to the relation of the Philippines to the United States was the one equalizing the Philippine tariff on sugar and tobacco with the tariff of the United States. Four new government vessels were authorized for the lighthouse service, two revenue cutters for the customs and immigration service, besides the acquisition of a new cable ship. A franchise for long-distance telephone communication was granted, and also two for foreign radio communications.

Trade Factors in Legislation.—A disturbing factor in the Philippine situation in the early part of 1929 was the fact that there was a possibility of legislation which would deny Philippine products full and free access to American markets. During the special session the Legislature appointed a committee to submit its views on Philippine matters to the Government at Washington and to present such petitions or memorials as might, in their judgment, be proper. The Acting Governor General also designated the Secretary of Agriculture and Natural Resources to proceed to the United States, at the same time, in the interests of agricultural promotion and economic development in the Philippines and to attend any hearings of Congressional committees on the question of the proposed revision of the tariff affecting Philippine trade. Manuel Roxas, Speaker of the House of Representatives, and Sergio Osmena, of the Philippine Senate, representing the Legislature, and Secretary Alunan arrived in Washington on April 12th, accompanied by the newly elected Resident Commissioner, Camilo Osias. They presented to the appropriate Congressional committees the unfortunate effects which would result from such legislation and strongly urged that no change be made in the present satisfactory trade relations between the United States and the Islands.

FINANCIAL AND ECONOMIC CONDITIONS

Finances.—The finances are in excellent condition. Receipts are well in excess of expenditures and the surplus at the close of 1928 ($20,589,633.73) shows a moderate increase over the preceding year. There was an increase of almost 27% in the income tax collections; of nearly 5% in internal revenue collections; of over $1,000,000 in the amount of currency in circulation. There is a great demand for public improvements and large sums are needed for education, health, etc. The net bonded indebtedness of the Government at the end of the year was $87,618,500, for which there were accumulated sinking funds amounting to over $21,500,000.

Philippine National Bank.—The net profit of this institution for 1928 was $1,442,500 as compared with $2,019,000 for 1927. Operations for 1928 covered more normal conditions than prevailed during 1927, because in the latter year there was included in the earnings a large amount of back interest due by the sugar centrals in which the bank is interested. Loans to those centrals were reduced during the year from $19,625,000 to $17,201,500.

Cebu Portland Cement Company.—The net profit amounted to more than $215,000 as compared with approximately $187,500 for 1927, the result mainly of the improved price received for cement.

Manila Railroad Company.—The net income amounted to $1,520,500, an increase of nearly 38% over the average net income for the year ended December 31, 1927. During the past five years the Company has reduced its bonded indebtedness by the sum of $1,090,500.

Manila Hotel Company.—This Company reported net profits of $58,769.89 as compared with $45,693.24 for the preceding year. On December 31, 1928, the total indebtedness of the Company amounted to only approximately $129,000, as compared with a net worth of over $672,000.

Economic Development.—Governor Stimson attributes the slow economic development of the Islands to racial and tropical inertia, the hesitancy of foreign capital to enter the Islands while their future political status is deemed uncertain, and the historic Filipino policy toward the public land. He considers this native sentiment against land monopolization to be one of the deepest and most controlling currents of public opinion in the Islands, and, as a result, concludes that agricultural development of a character which requires the coördinated production of large tracts of land must be reached by coöperative efforts of a large number of landowners grouped about a common central which guides, fosters, and finances them under contract, rather than by large holdings in fee by a single corporation. It is estimated that there are 14,000,000 hectares of idle land suitable for cultivation and that, at the present rate of progress, 400 years will be required to get it under private ownership and cultivation. This problem of getting available land in the hands of the people is the gravest one confronting the Government, in Governor Stimson's opinion. No very significant mineral wealth has been discovered or developed, and manufactures are almost negligible. At present, the population is almost wholly devoted to a few basic forms of agriculture—rice, sugar, coconuts and hemp being the principal crops.

Trade Items.—The total trade of the Islands amounted to $289,711,444, an increase of nearly 7% over the previous year, all of this increase being due to increased imports. Of this trade, 69% was with the United States, imports from there amounting to over $83,500,000, an increase of 17% over 1927. About 47% of the trade was carried in American vessels. Exports amounted to $155,000,000, a decrease of about .3% from the previous year. There was a decrease in the value of sugar, abaca, coconut oil, maguey and tobacco; but the balance of trade is still in favor of the Islands. Imports totaled $134,656,898, an increase of 16.2% over 1927. The importation of cotton goods, iron and steel, mineral oils, meat and dairy products, automobiles, wheat flour, silk and paper in every instance registered an increase over the previous year. More than 50% of all these articles are imported from the United States and, in the case of iron and steel, mineral oils, automobiles and wheat flour, well over 75%. With the exception of the general rise in practically all lines of imported articles and the sudden substantial increase in exports during the month of December, the foreign trade situation offered no interesting development.

EDUCATION

Enrollment.—There were 1,111,566 pupils enrolled in the public schools during the year, a slight increase over the previous year. The increase in enrollment does not quite keep pace with the increase in population, however. It is estimated that 35.45% of the children of school age were enrolled. Special emphasis was laid this year on the importance of public health and sanitation. It is highly desirable to have more American teachers for instruction in English. In private schools there were 84,813 students.

Expenditures.—More than 28% of all expenditures of Insular funds were spent for education. The total expenditures by the Insular Government (not including those from provincial and municipal funds) for school purposes amounted to $9,484,549, an increase of 5.71% over those for 1927.

HEALTH CONDITIONS

Sanitation Work. — The general health sanitation is good. Rural sanitation work has been one of the outstanding activities during the year. There were no epidemics of a serious character. There were 16 sporadic cases of cholera, with 8 deaths, reported from the provinces, and 2 cases in Manila, neither of which was fatal. The treatment and control of leprosy, as well as of malaria, were considerably enhanced during the year.

Leprosy.—There were 6,159 lepers under confinement at the end of 1928, 5,302 in the Culion Leper Colony, 381 in San Lazaro Hospital, and 476 in detention camps. Over 400 patients were released from treatment stations, this being the largest number released in any one year. The Leonard Wood Memorial for the Eradication of Leprosy, an organization independent of the Government but working in close coöperation with it, has started active preparatory work this year. As a result of one donation alone, the construction of buildings for a new treatment station at Cebu had started. This will be the finest institution of its sort in the world. The fact that more and more patients are presenting themselves voluntarily for treatment in the early stages of the disease is most encouraging.

VIRGIN ISLANDS, GUAM, AND AMERICAN SAMOA

By W. R. Furlong

Captain, U. S. N.; Office of Island Governments, Navy Department

---

VIRGIN ISLANDS

Governor.—Captain Waldo Evans, U. S. N., retired, appointed March 1, 1927.

Population of the Virgin Islands in 1901 was 30,527; in 1917, when the islands were acquired by the United States Government from Denmark the population had fallen to 26,051; and in 1927 it was 20,728, of which only about 2000 are whites. The reduction is due to removal of emigration restrictions on transfer of islands from Denmark to the United States. The language spoken is English.

Government.—The Act of Congress approved March 3, 1917, by which the purchase of the Virgin Islands was authorized, specifically continued in effect all local laws that were in force at the time of the transfer and were not incompatible with the changed sovereignty, until otherwise provided by Congress, or repealed, altered or amended by the Colonial Council having jurisdiction. Upon taking over the islands, the President appointed an officer of the Navy as governor. The organization of the government falls roughly into the three divisions of legislative, executive, and judicial. The legislative branch consists of two colonial councils, one for the Island of St. Croix, and the other for the Islands of St. Thomas and St. John. They pass all the laws governing the islands, which laws are subject to veto by the governor and approval or veto by the President. The members are supposed to be representative of both the people and the government, in that approximately 70% are elected and 30% are appointed by the governor, although the United States Treasury supplies more than 50% of the funds expended to run the government.

Sugar Production.—The only island now producing sugar is St. Croix. Due to the scarcity of rain from January to the middle of September 1928, the sugar crop just harvested in St. Croix, for export during the fiscal year ending June 30, 1930 is the smallest within the present century, with the exception of 1923 and 1924. There were manufactured during the fiscal year 1929, 3875 tons of which 1000 tons came from the crop of the previous year. During the fiscal year 1929, 8004 tons of sugar were exported, valued at $669,398. The average sugar crop over a number of years in St. Croix has been about 7,000 tons. There being no artificial water supply, the size of the crop depends entirely upon rainfall. Generous rainfall during September, 1928, and at infrequent intervals during the remainder of the fiscal year gives prospect for a crop above average for the next year.

Labor.—Next to the uncertainty of rainfall, the greatest problem in the production of sugar is agricultural labor. The importation of Porto Rican labor has been a partial solution. While the crop just harvested could be handled by the available labor, great difficulty will be experienced in handling the large crop anticipated. The native agricultural labor has decreased nearly ten per cent during the past year, partly through emigration to the United States and partly by loss to other occupations.

Cattle Industry.—Second only to the production of sugar, the raising of cattle looms as an increasingly important island industry. Porto Rico furnishes an attractive market. On June 1, 1929, the U. S. Department of Agriculture assigned a veterinarian to duty on the staff of its Experimental Station in the Virgin Islands. It is hoped by his assistance to enhance the cattle industry and to determine what breeds of cattle are best adapted to conditions in the Islands.

Bay Rum.—St. Thomas bay rum is now shipped in increasing quantities to the United States for distribution. The production for the fiscal year 1929 amounted to 91,116 gallons, against 91,628 gallons for the fiscal year 1928.

Alcohol.—The industrial alcohol plant, denaturing plant and bonded warehouse of the Virgin Islands Products Corporation, at St. Croix, were damaged by the hurricane in 1928. As a result only 82,629.76 gallons of alcohol were produced during the fiscal year 1929 as compared with 145,296 gallons in 1928.

Shipping.—A greater number of ships entered the harbor of St. Thomas during the year than during any previous year, being 655 of 2,651,397 gross tons, of which 523 paid pilotage amounting to $16,194.

Revenues.—The Virgin Islands are not self-supporting, and in order to maintain the standards which have been set since the transfer, it is necessary for the local Colonial Councils to enact budgets considerably in excess of the local revenues, the deficits being made up from the Congressional Appropriation. The United States Government appropriates annually about $275,000. For the fiscal year 1930, following the hurricane a federal appropriation of $314,000 was made.

Health.—The birth and death rate per thousand over a five year period, 1924-1928, were 23.1 and 21.5, respectively. There are municipal hospitals in St. Thomas, Christiansted, and Fredriksted; also a Sanitation Service in each Municipality; a Leper Asylum, Insane Asylum and a Poor Farm in St. Croix. There is also a dental service in each municipality. These health activities are administered by medical officers of the Navy. In the municipal hospital, St. Thomas, there is one civilian physician on the staff, also a civilian municipal physician in St. John. There is a municipal dentist in St. Thomas and one in St. Croix. The municipal hospital at St. Thomas is administered by a Medical officer of the United States Navy and, in addition to the civilian physician, one naval medical officer is assigned to duty. The work of the graduate nurses and student or pupil nurses is supervised by members of the Nurse Corps of the United States Navy. The sanitation services in St. Thomas and St. Croix are administered by naval medical officers. These services employ sanitary inspectors who regularly inspect the towns. On June 30, 1929 there were 79 patients in the leper asylum and 44 patients in the insane asylum. The lepers are constantly undergoing treatment and there have been excellent results.

Education.—Education is compulsory. During the fiscal year 1929 a total of $95,269.67 was made available for educational purposes, or an average cost per pupil of $32.29. The school enrollment was 2950 as compared with 2919 during the previous fiscal year. Thirty-one pupils graduated from the junior high schools during the past year. During the fiscal year 1929, 114 teachers were employed in the public schools.

Water Supply.—The poor economic condition of the Islands arises from an inadequacy of water supply. Since 1917, the United States Government has appropriated a considerable amount of money for use in the construction of reservoirs and sewerage systems. Within the last two or three years shallow wells have been drilled providing a supply of water for cattle. In St. Thomas, four public water-supply units, previously erected by Congress, are in operation, from which approximately 3,600,000 gallons of water are supplied to the populace without charge. The importance of this supply is emphasized by comparison with the total capacity of private cisterns in the city of St. Thomas, estimated at 5,000,000 gallons. Scarcity of water is the most conspicuous natural deficiency in the Islands. The sugar planters in St. Croix, and to some degree the cattle rangers, are handicapped in their cultivation by shortage of water. Consideration has been given to the feasibility of impounding surface drainage or deep-well exploration.

GUAM

Governor. — Commander W. W. Bradley, U. S. N. The government seat is Agana.

Government. — On December 23, 1898 the President placed the Island of Guam under the control of the Navy Department. The governor is appointed by the President. The Island is governed under Spanish laws that existed in 1898, modified and supplemented as required for local conditions by the governor, whose executive orders have the force and effect of law. Officers for administering the government are quite similar to those in a county in the United States. There is also a Congress which assembles periodically.

Population.—The total population on June 30, 1928, was 17,654, of which 16,805 are natives, known as Chamorros. The language is intermediate between the Philippine and Melanesian linguistic groups. The inhabitants have a Spanish-Mexican-

Philippino strain, with Malay predominating.

Health.—For the fiscal year 1930 the U. S. Government appropriated $22,000 for care of sick and maintenance of lepers. There are no civilian physicians or hospitals here nor could the population maintain them, and the natives, numbering nearly 17,000, are, with few exceptions, dependent for prevention of disease and for medical care upon the Federal Government. The hospitals are operated by naval surgeons, naval nurses and native nurses who have been trained. Lepers and insane are sent to Culion Leper Colony and San Lazaro Hospital, P. I.

Education.—For the fiscal year 1930 the Federal Government appropriated $13,000 for education. This is in addition to about $50,000 which is appropriated from revenues raised by the local government. The schools had a registration in 1929 of 3701. There are 26 public schools, with 131 teachers, of whom 14 were Americans and 117 natives.

Agriculture.—The main occupation of the natives is agriculture, nearly every family owning and cultivating small ranches which supply their principal necessities. The principal crop of the island and practically the only item of export is copra. During the fiscal year 1928 the value of copra and cocoanut oil amounted to about $195,862.87 as compared with $88,367.57 in 1927. The imports amounted to $454,599.61 as compared with $415,936.42 in 1927. The trade is chiefly with the United States, although there is considerable trade with Manila and Japan.

Shipping.—Few ships call at Guam on the passage between the United States and the Orient. In 1928 mail was received direct from the United States 11 times and twice by way of Manila. Navy and Army transports call at Guam and three calls have been made yearly in recent years by commercial ships.

AMERICAN SAMOA

Governor.—Captain Gatewood S. Lincoln, U. S. N.; took office August 2, 1929.

Government.—The governor is appointed by the President. Samoa was acquired in 1900 and 1904 by cession from the high chiefs of Tutuila and Manu'a. A joint resolution by the Congress of the United States, approved February 20, 1929, formally accepted the cession. By this act also a congressional commission has been appointed by the President to make such recommendations to Congress concerning legislation for the islands as they deem proper. It consists of two senators, two members of the House of Representatives, and three Samoan chiefs. They will meet in Samoa in the summer of 1930. The regulations issued by the governor have the force and effect of law. The governor is guided in the issuance of regulations and in the making of the budget by the representations and vote of the native legislative body known as the Fono. No direct appropriations are made by the Federal Government for government expenses, but indirectly all of the executive officers and medical officers and naval nurses are members of the naval service and accordingly receive their pay from the Federal Government. The expense is borne by the Federal Treasury for the maintenance of hospitals and dispensaries; a station ship for communication between the islands, and the upkeep of housing facilities for the officers who are also the executive officers in the island government. This amounts to about $475,000 yearly.

Population.—The population June 30, 1927, was 8730; June 30, 1928, 8940; and June 30, 1929, 9172. The present population of Swain's Island which was made a part of American Samoa in 1925 is 83. The Samoans are true Polynesians, perhaps the finest physical specimens of the race. There are very few of any race other than the natives in the islands except the officials. The people are not decreasing in population and they have not lost their native lands. These two conditions arise from the fact that health has been particularly guarded by the Federal Government and the lands have been retained by the people through a strict enforcement of the law maintained by succeeding governors to the effect that no native land can be disposed of to persons other than of the Samoan race.

Taxes.—The subject of taxes and that of copra go hand in hand as practically all the money with which natives' taxes are paid is derived from the sale of copra. The taxes for each male taxpayer are $6.00 poll tax and $3.00 school tax.

Revenues.—The total customs revenue from all sources for the year 1927-1928 was $72,833.43; and for the year 1928-1929, $73,923.30. The value of merchandise on which duty has been collected, excepting parcel post, during the fiscal year 1928-1929 is as follows: from United States, $81,309.00; Australia, $58,890.00; Germany, $3,549.00; Japan, $935.00; France, $53.00; China, $1,035.00; all other countries the merchandise was valued at $26,703.00, a total of $172,465.00, as against $167,064.00 for the last fiscal year.

Education.—The 1929 teaching staff consists of fifty-four, of whom forty-seven are Samoans and seven white. The number of children enrolled in the public schools is 1927, the largest in the history of the system. There are 20 school buildings, 8 of which are American. Fifteen of the schools have plantations. Poyer is the largest and best school in the islands; and it is in this school that most of the island teachers are educated. Sixty-eight teachers and candidate teachers attended the normal school at Poyer this year. Native nurses are educated in the hospitals. Training in vocal music begins with the chart class and runs through all the higher grades. The sum of $16,109.28 was expended in the Department of Education during the year 1929.

Highways.—The highways already established have been kept in a fair state of repair. The total amount expended by the Public Works Department in all its projects was $28,953.89.

Banking.—The net earnings of the Bank of American Samoa for the calendar year 1927 were $1,039.78, while the net earnings for 1928 were $2,204.51. Due to this increase, the interest rate on savings deposits was advanced from 2½ to 4 per cent per annum. At the present time the savings accounts number 283, totaling $57,512.64, as against 197, totaling $40,118.98 on June 30, 1927. The bank is operated by the government.

Copra production for the year 1927 was 551½ tons, valued at $52,834.55; for 1928 it was 1,686 tons, valued at $167,911.84; and the present indications are that the crop for 1929 will exceed by at least 200 tons the largest crop ever sent out, that of 1924, which amounted to 1,750.3 tons. The native growers bring their copra to a central shed at Pago Pago where it is handled by the government, the whole crop of the island being sold to the highest bidder. The crop for 1929 is to be sold to a San Francisco company for $92.51 per ton. The proceeds are distributed directly to the native producers.

Communication.—The main radio station at Pago Pago handles commercial as well as governmental radio communication. During the past year the radio station at Tau has been rebuilt. Steamer communication with Samoa is by the Matson Steamship Company, between San Francisco and Australia. There is a sailing every three weeks with calls at Samoa going and returning.

Health.—Sanitation of the islands under American administration is carefully watched and progress is as continuous as funds will admit. The naval personnel have entire charge of public health and medical treatment. There are no civilian physicians, as the native population is treated without cost and the foreign element is very small. During the past year extensive experimental work has been done under the direction of the Public Health Officer in connection with the treatment of filariasis and elephantiasis.

VI. TERRITORIES AND SPHERES OF INFLUENCE

MARITIME JURISDICTION

By Charles E. Hill

Professor, George Washington University

INTERNATIONAL CONFERENCE ON SAFETY OF LIFE AT SEA

This Conference met in London, April 16 to May 31, 1929, and concluded a convention on safety of life at sea to replace the one of 1914. The representatives of eighteen governments signed. The convention will come into effect July 1, 1931, provided at least five parties have deposited their ratifications. More stringent requirements than now exist are set forth concerning water-tight subdivisions and decks, fire-resisting bulkheads, exits, pumping apparatus, and stability tests. Sufficient lifeboats are to be provided to accommodate all persons on the ship. All passenger vessels and all cargo ships of over sixteen hundred tons gross are to be fitted with radio. Other items relate to ice patrol, distress signals, dangerous goods in the cargo, inspection and issuance of safety certificates.

LIQUOR SMUGGLING CONVENTIONS

In addition to conventions for the prevention of smuggling of intoxicating liquors with Great Britain, Norway, Denmark, Germany, Sweden, Italy, the Netherlands, Cuba, Spain, Belgium, and Greece, a similar convention has been negotiated and signed with Japan. This convention has not as yet been approved by the United States Senate or by the Government of Japan. It provides that Japanese vessels may enter the territorial waters of the United States with their supplies of liquor under seal in return for which Japan concedes that the United States may visit and search Japanese merchant vessels within an hour's run from shore.

THE CASE OF "I'M ALONE"

Pursuit and Sinking.—By far the most spectacular and probably the most important event connected with maritime jurisdiction during the year occurred in March, 1929. The *I'm Alone* had cleared from Belize for Hamilton, Bermuda, with a cargo of liquor March 6 without having proceeded to the destination. The *I'm Alone*, March 20, was sighted by the United States Coast Guard vessel *Wolcott* within ten and eight-tenths miles of the coast of the United States. The *Wolcott* ordered the *I'm Alone* to heave to, but this order was ignored, whereupon the *Wolcott* fired a warning shot across the bow of the *I'm Alone* and repeated the command to heave to. The *I'm Alone* ignored this warning as well, and proceeded seaward. The *Wolcott* fired several shots through the sails and rigging of the vessel when the *Wolcott's* gun jammed. The *Wolcott* kept in close pursuit and reported the incident to the commanding officer at Pascagoula, Mississippi, who dispatched the vessels *Dexter* and *Dallas* to assist the *Wolcott*. The *Wolcott* continued the pursuit of the *I'm Alone* and was at all times within sight of it. The *Dexter* came up to the *I'm Alone* about eight o'clock A. M. March 22nd. The commander of the *Dexter* ordered the *I'm Alone* to heave to, but the master refused, saying that he would rather be sunk than stop. The commander of the *Dexter* informed him that the *I'm Alone* would be sunk unless it obeyed the command to stop. Warning shots were fired and the *I'm Alone* did not stop. The *Dexter* fired through the rigging, and later put about a dozen shots into the hull of the *I'm Alone*. The *I'm Alone* sank about nine o'clock. The Coast Guard vessels picked up the members of the crew with the exception of one person who had drowned.

Canadian Protest.—The Canadian Minister to the United States filed a protest. He admitted that the *I'm Alone* registered at Lunenburg, Nova Scotia, had unquestionably been engaged for a number of years in endeavoring to smuggle liquor into the United States. He stated that the Government of the United States was familiar with the extent to which the

Government of Canada had endeavored to fulfill its neighborly obligation under the convention of 1924 for the prevention of smuggling of intoxicating liquors. Under that convention, the parties reaffirmed their intention to uphold the three-mile limit of territorial waters. Great Britain agreed to raise no objection to the boarding of private vessels under the British flag outside territorial waters by United States authorities for enquiry and if appearances warranted their search as to whether the vessel was endeavoring to smuggle liquor into the United States. If reasonable cause appeared, the vessel might be seized and taken into a United States port. The rights so conferred were not to be exercised at a greater distance from the United States coast than could be traversed in one hour by the vessel suspected of the offense, or by any other vessel in which the liquor was intended to be conveyed to shore.

Canadian Claims.—The Canadian Minister claimed that the *I'm Alone* had at all times been beyond the limit of an hour's sail from shore, and that the sinking took place over two hundred miles southward in the open sea. He agreed that international law recognizes that pursuit begun within territorial waters may be continued on high seas if immediate and continuous, but he reiterated that this pursuit did not begin within the territorial three-mile limit, which is an essential factor. He pointed out that the seizure had been unduly drastic; that the convention of 1924 had afforded no point for the destruction of a vessel by shell fire on the high seas accompanied by loss of life. Furthermore, he pointed out that it was not the original vessel, the *Wolcott*, but another vessel, the *Dexter*, that had come up and completed the pursuit and effected the sinking.

Submitted to Arbitration.—Inasmuch as there were some differences in regard to the facts and the principles of law, the Secretary of State offered to have the case submitted to arbitration in accordance with the provisions of the treaty of 1924. The Canadian Government accepted this proposal. Accordingly, the case will be first heard by two compositors, Eugene LaFleur of Montreal and Justice Willis Van Devanter of the Supreme Court of the United States. John E. Read is the Canadian Agent and George Wharton Pepper is the Agent for the Government of the United States. The hearings will no doubt begin in March, 1930.

THE DOCTRINE OF "HOT PURSUIT"

The Vinces.—Numerous cases uphold the contention of the United States that the right of "hot pursuit" was exercised in a lawful manner. In the case of the *Vinces*, the schooner was signaled to stop by a Coast Guard vessel seven and one-half miles from shore. She refused to heed and was chased twelve and three-quarters miles from shore and was seized. The court expressed itself as follows: ". . . We think it is clear under the hot pursuit doctrine that if the right of seizure existed at the time the vessel was signaled the right was not lost because she had succeeded in getting further from port in her attempt to run away." Other cases in which the Federal Courts have upheld the doctrine of hot pursuit are the *Pescawha* and the *Newton Bay*.

The Siloam.—The American fishing vessel *Siloam* was pursued from within the Canadian three-mile limit by the Canadian vessel *Malaspina*. The American vessel refused to heed the order to heave to. The *Malaspina* fired and sunk the fishing schooner and killed a member of its crew by rifle fire. The action taken by the *Malaspina* was upheld by the Canadian courts.

The Katina.—Another decision of particular interest is that in the case of the *Katina* rendered by the Court of Appeals in Egypt, an international tribunal. The *Katina* flew the Greek flag and was engaged in smuggling hasheesh into Egypt when seized off Rosetta beyond the territorial waters. The mixed court found that the ship had been given notice within the Customs zone and that under these conditions it was unnecessary to enter into the discussion of the parties as to the exact point the seizure itself was effected.

SPHERES OF AMERICAN INFLUENCE

By Roy Malcom

Professor, University of Southern California

NICARAGUA

Press Comment.—Interest in Nicaragua abated somewhat after the elections held in the fall of 1928 under American supervision. *La Prensa*, a strong Conservative organ, carried the following headlines Nov. 5: "The American supervision has honorably observed its promise. The elections Sunday were honest, tranquil, correct and honorable. The Liberals obtained the victory." *El Comercio*, the outstanding Liberal organ, commented as follows: "The United States is vindicated before the world." These comments, along with others, seemed to indicate that there was a feeling of general satisfaction throughout the country.

President Hoover's Visit.—This feeling was somewhat strengthened by the friendly visit of President-Elect Hoover. His reception throughout Nicaragua was warm and genuine. At Corinto, where a luncheon was given in his honor, Mr. Hoover sat at the same table with the leaders of the two political parties, President Diaz, Conservative, and President-Elect Moncada, Liberal. In addressing the guests at the table Mr. Hoover remarked: "I treasure this as a great day in my career as the new President-Elect of the United States. I hope that General Moncada will remember it as one of the great days in his career." He pointed out that the occasion represented "the growing unity of the Nicaraguan people." "It represents," said he, "the consolidation of the forces of domestic peace. It demonstrates that the difficult national crisis into which my own country has been drawn has now reached a basis of solution which merits the deepest thankfulness of all our people and for which I wish to congratulate the leaders of the Nicaraguan nation."

U. S. Marines.—Throughout January the United States Marines cooperating with the Nicaraguan government, were engaged in suppressing raids and attacks in the northwestern part of the country. Word from Washington stated that some 38 officers and 1,194 men of the Marine Corps were ordered withdrawn in January. In February President Moncada of Nicaragua asked Lieutenant-Colonel Joseph A. Russell of the United States Marines to aid a commission of prominent Nicaraguans in working out constructive plans for the rehabilitation of Northwestern Nicaragua. On April 19 a letter from President Moncada to Brig. Gen. Logan Feland, former commander of marines in Nicaragua, was made public. In this letter President Moncada expressed his appreciation of General Feland's work, stating that a great service had been rendered peace and law, and that the Americans had gained the goodwill of the people of Nicaragua.

Moncado on Monroe Doctrine.—President Moncado was reported to have made a statement to the press in April which caused quite a bit of comment here and in Nicaragua. "The Monroe Doctrine," stated President Moncada, "is a declaration of intervention in Latin-American destinies. I believe the existence of the doctrine obligates the United States to fulfill certain undeclinable duties and to assist the republic in maintaining peace and development of the Republican governmental system. But this help must be material and not simply a program." He went on to point out that the "abrogation of the Monroe Doctrine is an international affair and would oblige the American republics to subsist alone, trusting to their own resources and nothing else. The present government did not ask for marine aid to reëstablish order in Nicaragua. It was a request from the previous government. The present government is dedicated to the reëstablishment of order and the correction of government ills."

Canal Survey.—In June President Hoover authorized the sending to Nicaragua of a battalion of Engineer troops to investigate and make a survey for the purpose of getting at the practicability and cost of building a canal through Nicaragua, as provided for by the Seventieth Congress. Full privileges were accorded the troops by the Nicaraguan government. The work of surveying the route of the proposed canal will be supervised by the Interoceanic Canal Board, composed of five military and civilian engineers appointed by President Hoover. The list given out includes Sidney B. Williamson of New York; Dr. Anson Marston of Ames, Iowa; Frank B. Williams of Albany, New York; Major Ernest Graves, retired; and Lieutenant-General Edgar Jadwin, retired, former chief of army engineers.

Augustino Sandino, the leader of the Nicaraguan rebels who opposed the American peace terms of 1927, as worked out by Mr. Stimson, left his country in June to go into exile in Yucatan. He is reported to have said in an interview: "Right now American Imperialism is provoking trouble between Honduras, Salvador and Guatemala, striving to create an opportunity to step in and acquire islands for the establishment of a new naval base."

Inter-American Highway.—It was reported from Washington in September that United States Secretary of War Good had named a picked engineering battalion of some 400 officers and men for the purpose of making reconnaissance surveys, looking toward the construction of an inter-American highway.

CUBA

Defamation Charges. — American interest in Cuba was renewed in February when a number of men were arrested in Havana, accused of taking part in a plot to assassinate President Machado and thus bring about the armed intervention of the United States. On April 16 Cuban Ambassador Orestes Ferrara issued a statement in Washington in which he claimed that certain groups of persons were conducting a "campaign of defamation" in the United States against Cuba. He charged that the groups were composed of Americans and ex-patriot Cubans. It appeared that these charges grew out of a series of articles published in New York that dealt with certain repressive measures adopted by the Cuban government, the responsibilities of the United States under the "Platt Amendment," and the rights of one J. E. Barlow, an American resident of Havana, who claimed several millions of dollars damage against the Cuban government for having taken property from him.

American Property Rights.—The question of the protection of American property rights in Cuba were raised again in the summer and in September United States Secretary of State Stimson and other officials of the State department appeared before the Senate Foreign Relations Committee to discuss the whole matter.

DOMINICAN REPUBLIC

Dawes Mission.—Of particular significance to those interested in our Caribbean relations was the announcement in March that President Vasquez had invited Charles G. Dawes, at the conclusion of his term as Vice-President of the United States, to head an advisory commission to his country to revise and revamp the whole economic and financial administrative organization of the nation, both national and municipal. The group included the following: Charles G. Dawes; General James G. Harbord, president of the Radio Corporation of America; Sumner Welles, former Commissioner to the Dominican Republic; H. C. Smither, former chief coördinator of the budget system; J. Clawson Roop, former assistant director of the bureau of the Budget; T. W. Robinson, vice-president of the Illinois Steel Company; Henry P. Seidemann of the Institute of Government Research; and E. Ross Bartley, secretary of the mission. The mission arrived in Santo Domingo April 2 to begin work.

Statement of Gen. Dawes.—General Dawes returned to New York April 29 and gave out the following statement concerning the work of the American commission which he had headed: "The report which this commission completed and handed to President Vasquez of the Dominican Republic last Monday contained in a codified form ready for enactment a budget law which, in addition to the usual provisions, provided also for the establishment of an executive control of expenditures; an accounting law, making compulsory a proper system of governmental budget accounting, proprietary accounts to produce a balance sheet and adequate operating statements; a law regulating projected public improvements; a modified law of finance and the necessary repealing laws. This part of our report, together with certain recommendations for changes in departmental organization, comprised our specific plan. We then reviewed the Dominican budget item by item and made suggestions with accompanying explanations as to the manner in which economies might be effected under our plan in operation. In addition, collective statements were made showing the condition of governmental finances, including direct and indirect liabilities, a difficult and exacting work in the condition in which we found the accounts, which had been kept under an inadequate and decentralized system."

PANAMA

Pending New Treaty.—On October 31 the American State Department authorized the publication of the following statement: "The State Department has agreed to open conversations with Panama leading to a new Canal relations treaty to replace that of 1903, under which the Panama Canal zone was ceded to the United States. The conversations will begin soon. The action will be taken at the request of Panama, which in January, 1928, forwarded through Minister Alfaro, a memorandum which held the treaty signed in 1926 to be unjust. The proposed new treaty would replace not only that of 1903 but also the document signed in 1926 in regard to Canal relations, which never has been ratified by the congresses of either government."

INTERNATIONAL CONFERENCE ON CONCILIATION AND ARBITRATION

Arbitration Treaties.—Of considerable moment in the field of American-Caribbean relations was the International Conference of American States on Conciliation and Arbitration which met in Washington from December 10, 1928, to January 5, 1929. Two treaties were drawn up by this Conference, one, a General Treaty of Inter-American Arbitration, the other, a General Convention of Inter-American Conciliation. Among the signatory powers, in addition to the United States, were Cuba, Nicaragua, Haiti, the Dominican Republic, and Panama. A number of other American powers also signed.

Article I of the Arbitration Treaty provides: "The high contracting parties bind themselves to submit to arbitration all differences of an international character which have arisen or may arise between them by virtue of a claim of right made by one against the other, under treaty or otherwise, which it has not been possible to adjust by diplomacy and which are juridical in their nature by reason of being susceptible of decision by the application of the principles of law." Article I of the Treaty on Conciliation provides: "The high contracting parties agree to submit to the procedure of conciliation established by this convention all controversies of any kind which may arise between them for any reason and which may not have been possible to settle through diplomatic channels."

PART THREE
GOVERNMENTAL FUNCTIONS

DIVISION VII
PUBLIC FINANCE AND TAXATION

NATIONAL EXPENDITURES AND REVENUES

By Merlin H. Hunter
Professor, University of Illinois

THE TREND IN NATIONAL FINANCE

President's Budget Report.—The Budget and Accounting Act of 1921 provides that the President, on the first day of each regular session of Congress, shall transmit the budget. This is to set forth estimates of all money needed by the Government for the coming fiscal year; of all receipts for the coming year; of receipts and expenditures for the current year; conditions of the public debt; and other statements which he may think necessary to show the financial condition of the Government. In case his estimate of needs exceeds that of receipts, recommendations to take care of the deficit must be made; in case the opposite conditions exist, he must make such recommendations as the public interests require.

1930 Budget.—The budget transmitted by the President for the service of the fiscal year ending June 30, 1930, indicates the state of the national finances. A summary is found in the following table. It contains a balanced statement of (1) the condition of the treasury at the end of the fiscal years 1927 and 1928; (2) the estimated condition of the Treasury at the end of the fiscal year in progress, 1929; and (3) the estimated condition of the Treasury at the end of the ensuing fiscal year, 1930, if the financial proposals contained in the budget are adopted.

ANALYSIS OF EXPENDITURES AND RECEIPTS

1928 Surplus.—In his analysis of the condition of the national finances, the President pointed out that the estimated receipts for the fiscal year 1928, as given in the 1929 budget, were $4,075,598,091 and the expenditures $3,621,314,285. The year closed with actual receipts of $4,042,348,156.19, and expenditures of $3,643,519,875.13. There was thus an actual surplus of $398,828,281.06 that year, which was $55,000,000 less than the estimate. Taking into consideration that subsequent to the transmission of the 1929 budget $50,000,000 was spent for carrying out the provisions of the settlement of war claims act of 1928, approved March 10, 1928, the real difference between the estimated and actual surplus for 1928 is but $5,000,000.

Estimated 1929 Surplus.—For 1929, the outlook is not so bright. In the budget for 1929, transmitted to the Congress in December, 1927, receipts were estimated at $3,809,497,314 and expenditures $3,556,957,031. This indicated a surplus of $252,540,283. This forecast has been materially changed. With actual operations for four months of the current fiscal year of record and a clearer conception of what is faced, the estimate is now that surplus this year will be $36,990,192. While this margin of receipts

ESTIMATED EXPENDITURES, 1929-1930, AND ACTUAL EXPENDITURES, 1927-1928

	Estimated, 1930	Estimated, 1929	Actual, 1928	Actual, 1927
Ordinary expenditures:				
(a) General expenditures:				
Legislative establishment	$ 19,520,299.00	$ 17,999,287.00	$ 16,402,048.28	$ 19,678,325.13
Executive office and independent establishments:				
Executive Office	450,000.00	468,080.00	589,497.19	612,197.93
United States Veterans' Bureau	422,646,890.00	422,890,883.00	401,324,883.17	391,470,413.72
Other independent offices and commissions:				
Alaska relief funds	15,000.00	15,000.00	18,625.22	14,744.90
Alien Property Custodian	.....	.....	34,508.12	159,322.07
American Battle Monuments Commission	600,000.00	2,100,000.00	117,218.83	104,993.17
Arlington Memorial Bridge Commission	2,705,000.00	2,995,000.00	2,266,406.82	1,454,732.38
Board of Mediation	322,000.00	322,000.00	275,828.07	226,671.05
Board of Tax Appeals	710,000.00	700,220.00	663,585.42	538,132.33
Bureau of Efficiency	225,000.00	223,010.00	216,311.31	175,165.08
Civil Service Commission	1,243,500.00	1,191,152.00	1,150,852.65	1,003,229.24
Commission of Fine Arts	9,000.00	7,555.00	7,195.04	8,084.76
Employees' Compensation Commission	4,077,000.00	4,117,150.00	3,642,577.97	2,939,687.16
Federal Board for Vocational Education	8,011,120.00	7,774,120.00	7,610,930.57	7,369,854.03
Federal Power Commission	174,300.00	130,003.00	48,470.95	30,864.12
Federal Radio Commission	164,440.00	331,000.00	54,036.88	.....
Federal Reserve Board	2,605,741.00	3,104,241.00	2,050,974.27	2,511,543.25
Federal Trade Commission	1,193,000.00	1,132,000.00	984,490.54	964,347.29
General Accounting Office	4,105,000.00	4,081,000.00	3,952,989.54	3,844,885.37
George Rogers Clark Sesquicentennal Commission	.....	200,000.00	.....	.....
George Washington Bicentennial Commission	.....	16,895.00	12,044.69	.....
Housing Corporation	350,000.00	387,500.00	477,348.65	485,042.01
Interstate Commerce Commission	8,195,000.00	8,001,399.00	7,147,548.71	6,609,454.35
Memorial to Women of the World War	.....	110,000.00	.....	.....
National Advisory Committee for Aeronautics	1,300,000.00	620,000.00	535,548.78	531,142.58
National Sesquicentennial Exposition	.....	.....	.....	1,292,979.21
Protecting interests of the United States in leases on oil lands	.....	46,000.00	76,930.59	9,019.39
Public Buildings and Public Parks of the National Capital	2,860,000.00	2,957,657.00	2,446,064.92	2,414,575.91
Public Buildings Commission	25,000.00	25,000.00	65,420.39	99,390.29
Purchase of Oldroyd collection of Lincoln relics	.....	.....	.....	50,000.00
Smithsonian Institution and National Museum	1,105,000.00	1,106,241.00	937,401.23	860,730.19
Tariff Commission	800,000.00	779,600.00	646,298.78	702,981.40
United States Geographic Board	9,200.00	4,295.00	4,052.52	3,248.83
Miscellaneous items	.....	184,374.00	32,562.17	2,889,254.38
Adjustment between cash expenditures and checks issued	.....	.....	205,238.82	3,927,205.37
Total other independent offices and commissions	$ 40,804,301.00	$ 42,662,412.00	$ 35,681,462.45	$ 35,442,771.15
Total Executive Office and independent establishments	$ 463,901,191.00	$ 466,021,375.00	$ 437,595,792.81	$ 427,525,382.80

	Estimated, 1930	Estimated, 1929	Actual, 1928	Actual, 1927
Department of Agriculture	$ 165,230,754.00	$ 161,510,724.00	$ 159,914,696.27	$ 156,287,304.95
Department of Commerce	52,153,000.00	40,905,000.00	34,383,165.32	30,939,749.02
Interior Department	291,253,069.00	297,742,215.00	298,999,534.09	302,706,745.19
Department of Justice	28,171,000.00	27,751,720.00	27,600,254.81	24,819,057.70
Department of Labor	10,637,362.00	11,667,000.00	9,821,480.97	9,921,644.26
Navy Department	361,795,000.00	384,619,100.00	331,335,491.98	318,909,096.28
Post Office Department	....	....	276,692.81	189,037.77
(For deficiency in postal revenues see below)				
State Department	14,466,831.00	12,951,391.00	11,607,071.23	16,497,668.60
Treasury Department	197,184,265.00	204,261,442.00	195,648,941.27	151,560,333.78
(For refund of receipts, see below)				
War Department	443,497,381.00	417,225,627.00	390,540,803.49	360,808,776.71
(For Panama Canal, see below)				
District of Columbia	39,377,107.00	39,463,423.00	39,399,622.44	37,566,520.57
			$1,953,525,595.77	$1,857,409,642.76
Adjustment of unclassified items	....	....	198,554.39	448,920.63
Total general expenditures	$2,087,187,250.00	$2,082,118,304.00	$1,953,327,041.38	$1,857,858,563.39
(b) Interest on public debt	$ 640,000,000.00	$ 675,000,000.00	$ 731,764,476.30	$ 787,019,578.18
(c) Customs refunds	21,515,500.00	21,505,500.00	21,856,901.13	20,320,524.37
(d) Internal revenue refunds	146,541,000.00	151,956,000.00	148,286,060.13	117,412,172.61
(e) Postal deficiency	71,209,325.00	83,495,830.00	32,080,202.46	27,263,191.12
(f) Panama Canal	10,111,000.00	10,070,368.00	10,448,879.83	8,305,345.04
(g) Railroads	2,054,000.00	1,450,000.00	619,721.67	1,042,746.21
(h) War Finance Corporation	....	500,000.00	3,814,040.77	27,065,781.61
(i) Merchant Fleet Corporation and Shipping Board	51,600,000.00	32,000,000.00	34,881,713.16	19,011,397.11
(j) Alien property funds	500,000.00	500,000.00	351,151.52	496,117.92
(k) Adjusted service certificate fund	112,000,000.00	111,220,000.00	111,817,839.69	115,219,352.30
(l) Civil service retirement fund	20,500,000.00	19,950,000.00	109,272.28	425,194.65
(m) Government life insurance	64,558,110.00	62,724,117.00	61,701,568.44	47,315,972.70
(n) District of Columbia teachers' retirement	585,000.00	580,000.00	513,917.75	289,908.43
(o) Foreign Service retirement	290,853.00	294,000.00	80,938.85	87,267.50
(p) General railroad contingent	....	900,000.00	1,179,957.39	870,677.84
Total ordinary expenditures	$3,227,652,047.00	$3,252,274,119.00	$3,103,264,854.83	$2,974,029,674.62
Public-debt retirements required to be paid from ordinary receipts:				
(a) Sinking fund	$ 379,524,100.00	$ 370,182,050.00	$ 354,741,300.00	$ 333,528,400.00
(b) Purchases and retirements from foreign repayments	10,783,500.00	10,219,300.00	19,068,000.00	19,254,600.00
(c) Received from foreign governments under debt settlements	160,185,000.00	160,995,000.00	162,736,050.00	159,961,800.00
(d) Received for estate taxes	....	....	1,500.00	....

	Estimated, 1930	Estimated, 1929	Actual, 1928	Actual, 1927
Public-debt retirements required to be paid from ordinary receipts (continued):				
(e) Purchases and retirements from franchise tax receipts (Federal reserve and Federal intermedite credit banks)	2,375,000.00	875,000.00	618,367.05	1,231,834.78
(f) Forfeitures, gifts, etc.	200,000.00	200,000.00	3,089,803.25	5,578,310.00
Total public debt retirements required to be paid from ordinary receipts	$ 553,067,600.00	$ 542,471,350.00	$ 540,255,020.30	$ 519,554,844.78
Total Expenditures payable from ordinary receipts	$3,780,719,647.00	$3,794,745,469.00	$3,643,519,875.13	$3,493,584,519.40

ESTIMATED RECEIPTS, 1929-1930, AND ACTUAL RECEIPTS, 1927-1928

	Estimated, 1930	Estimated, 1929	Actual, 1928	Actual, 1927
Ordinary receipts:				
(a) Customs	$ 582,000,000.00	$ 582,000,000.00	$ 568,986,188.50	$ 605,499,983.44
Internal revenue:				
(b) Income tax	$2,175,000,000.00	$2,165,000,000.00	$2,173,952,556.73	$2,224,992,800.25
(c) Miscellaneous internal revenue	559,000,000.00	577,500,000.00	621,018,665.64	644,421,541.56
Total internal revenue	$2,734,000,000.00	$2,742,500,000.00	$2,794,971,222.37	$2,869,414,341.81
Miscellaneous receipts:				
Proceeds of Government-owned securities:				
(d) Principal, foreign obligations	39,350,607.00	38,747,660.00	47,841,166.70	45,699,572.81
(e) Interest, foreign obligations	151,819,502.00	160,340,908.00	161,084,775.99	160,489,599.90
(f) Railroad securities	31,276,726.00	6,791,155.00	164,407,076.01	89,737,958.98
(g) All other	5,207,000.00	4,449,902.00	9,153,397.94	63,474,987.27
Total proceeds of Government-owned securities	$ 227,653,835.00	$ 210,329,625.00	$ 382,486,416.64	$ 359,302,118.96
(h) Trust fund receipts (appropriated for investment)	65,143,110.00	64,204,117.00	63,395,443.58	48,476,630.97
(i) Proceeds of sales of surplus property	6,712,765.00	9,078,665.00	8,770,250.64	18,068,529.98
(j) Panama Canal tolls, etc.	28,056,000.00	28,056,000.00	28,141,474.61	25,768,389.71
(k) Receipts from miscellaneous sources credited direct to appropriations	7,855,523.00	8,653,021.00	8,519,116.49	14,361,493.71
(l) Other miscellaneous	189,874,596.00	186,914,233.00	187,078,043.36	188,502,952.52
Total miscellaneous receipts	$ 525,295,829.00	$ 507,235,661.00	$ 678,390,745.32	$ 654,480,115.85
Total ordinary receipts	$3,841,295,829.00	$3,831,735,661.00	$4,042,348,156.19	$4,129,394,441.10
Excess of ordinary receipts over expenditures payable therefrom	$ 60,576,182.00	$ 36,990,192.00	$ 398,828,281.06	$ 635,809,921.70
Balance in general fund at beginning of fiscal year	234,057,409.85	265,526,980.79	234,057,409.85	210,002,026.71
Balance and excess of ordinary receipts over expenditures payable therefrom	$ 294,633,591.85	$ 302,517,172.79	$ 632,885,690.91	$ 845,811,948.41
Deduct amount of general fund applied or estimated to be applied to redemption of public debt, in addition to sinking fund and redemptions from restricted receipts	60,576,182.00	68,459,762.94	367,358,710.12	611,754,538.56
Balance in general fund at end of fiscal year for working capital	$ 234,057,409.85	$ 234,057,409.85	$ 265,526,980.79	$ 234,057,409.85

over expenditures is small, it is most gratifying, as on July 1, last, the best estimate that could be made indicated a deficit of about $94,000,000. The surplus now estimated is based on receipts amounting to $3,831,735,661 and expenditures of $3,794,745,459. The difference between the estimate of a year ago and this estimate is primarily reflected in the expenditure figures which have increased $238,000,000. The postal deficit accounts for $68,000,000 of this estimated increase in expenditures. Included in that amount is approximately $9,000,000 for overtime pay of postal personnel, $9,000,000 for carrying ocean and air mail, $14,000,000 for increase in rail transportation rates, and $36,000,000 reduction in postal revenues. Expenditures for flood control account for $16,000,000. Increases in the amount of pensions account for $11,000,000 and increases in pay of Federal personnel for $21,000,000. Tax refunds show an estimated increase of $18,000,000 and interest $5,000,000, while the Navy and Shipping Board expenditures account for $26,000,000. These are the major items which enter into the increase.

Estimated 1930 Surplus.—For the coming fiscal year, 1930, the estimate is that the receipts will amount to $3,841,295,829 and the expenditures $3,780,719,647, indicating a surplus of $60,576,182. The surplus margin for both this year, 1929, and next year, 1930, is small. It is however, satisfactory, as it points to a balanced budget. It is clear that we can not assume any great additional expenditures without jeopardizing this favorable outlook. We are committed irrevocably to a balanced budget and that carries the assurance that the only revision of our tax laws which will be considered is a revision downward. There is no thought of curtailing in any way the benefits which have gone to the people by the four reductions already made in taxes.

FOREIGN DEBT OBLIGATIONS

The President On the French Debt.—The foreign debt obligations continue to influence the finances of the Federal Government. As an indication of this, the discussion of the French debt in the Budget message of the President is significant. He said, in part: "On August 1, 1929, bonds of the French Government aggregating $400,000,000 will mature. At the conclusion of hostilities the American Expeditionary Forces in France had accumulated in that country vast stores of supplies, materials and equipment. Under the authority granted by the act of July 9, 1918, it was decided to dispose of these supplies in France. The President, therefore, created under the War Department the United States Liquidation Commission, whose main duty was to settle claims and dispose of this surplus property stored in France. The commission appraised the value of the materials for the purpose of the bulk sale to France at $562,230,800. After offsetting certain claims and counterclaims and taking into consideration the contention of the French Government that some of the supplies carried into France were subject to customs duties estimated at $150,000,000, it was agreed to transfer these supplies to the French Government, the latter to give in payment its 10-year 5 per cent bonds, dated August 1, 1919, in the amount of $400,000,000, interest thereon to be payable semi-annually from and after August 1, 1920. Under the terms of this contract the French Government delivered to the United States 400 of its 10-year gold bonds in the face amount of $1,000,000 each. These are the bonds that are due and payable August 1, 1929. Semi-annual interest on these obligations has been paid punctually.

"In addition to the foregoing France purchased other supplies from the War Department stocks in the United States for which it gave obligations aggregating $7,341,145.01, of which $6,566,762.42 mature on May 9, 1930, and $774,382.59 on July 5, 1930.

"All of the above-mentioned obligations were merged with the total obligations of France and included in the debt settlement agreement between the United States and France dated April 29, 1926, which funded the French indebtedness to the United States and under which the payments from France are spread over a 62-year period, with a material reduction in the interest rate. If, therefore, the debt agreement is ratified by the French Government and by the Congress of the United States prior to August 1, 1929, these obligations will not mature but will have become merged in the general indebtedness funded under the debt settlement.

"The $406,566,762.42 due in the fiscal year 1930 has not been included in the estimate of receipts for the reason that it is still expected the agreement of April 26, 1926, may be ratified prior to the maturity of these bonds. If, in accordance with the terms of this agreement, it is ratified in France, it is recommended that it receive the prompt ratification of the Congress of the United States.

"If the agreement is not ratified, it is believed that the $406,566,762.42 should be applied to the retirement of our war debt rather than treated as current receipts available for current expenditures."

FLOOD CONTROL AND BUILDING

Flood Control Estimates.—The President, in his budget message, gave particular attention to flood control and the building program. He pointed out that for the purposes of flood control the estimate contained in this budget carries $31,000,000. That is the additional amount which the War Department states will be required to meet expenditures in 1930. If it should develop that more funds are required by the War Department for this purpose to meet the needs for that fiscal year, a further estimate will be presented to the Congress.

Estimates For General Construction.—We are engaged upon one of the most ambitious and extensive building programs of peace-time history. When war was declared there had been appropriated by the Congress approximately $60,000,000 for projects widely scattered throughout the country, of which $30,000,000 remained unexpended. Building sites, some 150 in number, had been bought and construction thereon of needed public buildings was soon to begin. Imperative war demands postponed all activities of the sort, and when the war ended serious lack of suitable office and housing space to meet the demands of materially enlarged governmental activities—not only enlarged but rapidly increasing—were faced. Postwar reconstruction demands, an extraordinary debt and crushing taxes further deferred remedial action in the matter of governmental building requirements. Reduction in expenditures and resulting reduction in taxes warranted in the year 1926 enactment of a national public building act which launched a building program of $50,000,000 in the District of Columbia, where need of new and suitable accommodations was most urgent, and construction programs for the rest of the country totaling $115,000,000. In 1928 the Congress amended this act by increasing the total by $100,000,000, making a grand total of $265,000,000 for public buildings for the civil purposes of the land within the so-called triangle in the District of Columbia, needed for building purposes, thereby increasing the total provision for these general building purposes to $290,000,000. There has already been appropriated under these acts $68,617,083.56, and $28,040,000 is carried in the estimates for 1930. Contracts have been let for 71 projects totaling $19,881,152, of which 35 have been completed and 36 are under construction, to cost $14,635,952. The foregoing figures are exclusive of $8,000,000 for the appraisers stores building in New York City, the full amount of which has been appropriated.

Army and Navy Building Program.—The Army has well under way a building program, exclusive of air service hangars and like structures, of $118,000,000. There has already been appropriated for this purpose $20,751,409 and $15,041,950 is carried in the estimates for 1930, with $3,000,000 additional authorized for obligation by contract. The estimates for 1930 also carry for technical and other buildings for the air services of the Army and Navy a total in round numbers of $4,500.000.

Hospital Facilities. — Additional hospital facilities for the Veterans' Bureau to the extent of $15,000,000 have also been authorized by Congress, of which $7,000,000 has been appropriated. The budget estimates for 1930 provide $6,000,000 and in addition an authorization for obligation by contract of $2,000,000.

Foreign Service Housing.—The act of May 7, 1926, authorized an expenditure of $10,000,000 for houses and offices for our foreign representatives. The program is a 5-year project, appropriations being limited to $2,000,000 a year. There has been appropriated for these purposes $2,435,000, while the estimates for 1930 call for $2,000,000 additional.

Total Building Estimates.—These figures show a program, exclusive of technical buildings for air activities, which involves for its completion some $433,000,000.

NATIONAL DEFENSE

Army and Navy.—Expenditures for national defense have always occupied an important place in federal finances. In the opinion of the President ample provision is made in the budgetary estimates for national defense, the estimates for 1930 calling for $648,511,300 for the Army and Navy. This amount is reached after excluding from Army and Navy estimates all non-military items so that the figure given is the amount provided for purely military purposes. The actual expenditure for 1927 was $558,004,447; for 1928 it was $596,500,896; the estimated expenditure for 1939 is $672,844,288; while the estimated expenditure, as distinguished from appropriation estimates, is $668,277,712 for 1930. In submitting the annual budget for 1926 the Chief Executive stated that the amount carried in that budget for national defense was $549,000,000 and that in his opinion we could have adequate national defense with a more modest outlay of the taxpayers' money. Nevertheless our defense estimates have steadily climbed until the cash requirements have advanced for 1930 by approximately $100,000,000 more than was estimated for 1926. This increase, however, is more apparent than real, for in these prior years the defense establishments have had the use of surplus supplies left over from the war. As these reserves have become depleted it has become necessary to increase the cash provision to take their place.

Air Service.—The development of the air service has come to occupy an important place in Federal finance. In his discussion of this phase of the work the President states that the air interests of the Government are developing in a most satisfactory manner. The demands of this service, while large, have been adequately met. The 5-year program for the Army and Navy is approaching completion. Provision is made in these estimates for the third year increment of the Army and the fourth year increment of the Navy, and it is a fair assumption that at the end of 1931 the Navy will have a well-balanced fleet of 1,000 airplanes, while at the end of 1932 the Army will be in possession of 1,800 planes in proper proportion as to types. The necessary housing and other construction for the Army and Navy air forces are also provided for. The expansion of air activities, however, is by no means confined to the Army and Navy. The Department of Commerce, the Coast Guard, and the Department of Agriculture are playing their parts in the developing air program as is the National Advisory Committee for Aeronautics. While the Post Office Department definitely retired from the business of carrying mails in 1928, there is provided for 1930 for contract air mail service in the United States the sum of $14,300,000 and $4,000,000 additional for foreign air mail. While this is not Government-operated service it is Government-supported and can properly be cited as contributing materially to air service development. These estimates carry $6,427,260 for the Department of Commerce to carry on its import task in connection with commercial aviation. This estimate contemplates, among other items, the construction of 4,000 additional miles of lighted airways. There is provision in these estimates of $582,500 for the Department of Agriculture for obtaining weather predictions, fighting the boll weevil, and for forest patrol. The total expenditure contemplated for all these purposes, direct and indirect, during 1930 is $140,631,824.

The rapid and legitimate expansion of our air service, military and commercial, is an achievement in which we can all take pride. Without artificial stimulation this extraordinary new factor in national defense and commerce has grown from modest and discouraging beginnings into a strong, healthy, promising national activity. To-day we have more airplane manufactories than we have automobile factories. To-day air mail lines cross the heavens in a rapidly increasing network of speedy communication. Freight and passenger carrying airplanes are increasing and a growing demand is seen for airplanes for private use. The generous contribution made by the United States Government to this great and growing activity has been justified by the progress made and the results achieved.

THE BUDGET AND CONGRESS

Most members of Congress have taken kindly to the operation of the budget. In the eighth budget message the President expresses his appreciation of this attitude in the following language: "In submitting this, the eighth budget of the United States, the Chief Executive wishes to express his appreciation of the courteous, friendly, and businesslike consideration accorded his estimates by the Congress. It is a matter for congratulation that after the careful and painstaking consideration given budget estimates by the congressional committees there should be so little difference in results. Congressional action has amounted to practical ratification of the budget estimates. It is also a matter for congratulation that congressional revision has resulted in reduction of estimates. The first seven budgets (fiscal years 1923 to 1929) carried estimates totaling $27,000,475,970, which supplemental estimates increased to $29,800,233,790. On these estimates Congress appropriated $29,478,282,294, a reduction below budget requests of $321,951,495. Of this reduction $135,468,732 pertains to the budget for 1923, a reduction made possible by the Naval Disarmament Conference and the resulting curtailment of naval building projects as well as modifications in the Veterans' Bureau and Shipping Board programs. The total reduction in the six budgets following 1923 is $55,971,630, a percentage of difference of only one-fifth of 1 per cent. To the Chief Executive nothing could be more gratifying than the hearty coöperation of the Congress with the President on budget matters evidenced by these figures."

THE NATIONAL BUDGET

By A. E. Buck

National Institute of Public Administration

FORMULATION OF THE 1930 BUDGET

President's Fiscal Policy. — The preparation of the budget for 1930, that is, for the fiscal year beginning July 1, 1929, was started in the summer of 1928. At the meeting of the "Business Organization of the Government," held in Memorial Continental Hall on June 11, 1928, President Coolidge announced his "policy" with reference to the 1930 budget in the following terms:

> In less than six months the budget for 1930 must be laid before the Congress. I intend that the estimate of appropriations contained therein shall reflect expenditures well within our estimated receipts. With this in view I have tentatively fixed upon $3,700,000,000 as the amount available for estimates for 1930. This figure covers tax refunds, permanent and indefinite appropriations, the postal deficit, and funds for extraordinary new projects,

amounting in all to $460,000,000, which were not included in the maximum for 1929. The amount contemplated in the 1930 restrictive figure for the ordinary routine operations of government is really less by $60,000,000 than the availability for these purposes in 1929. The necessity of keeping expenditures within receipts, the importance of continuing our pay-as-we-go policy, can not be overemphasized. This primary limitation on estimates is the first step toward the continuation of that policy in 1930. It means that there will be no latitude for expansion where expansion is not made compulsory by new law or by conditions that leave no choice. In preparing your preliminary estimates for 1930, which you will submit to the Budget Bureau by July 15 next, you must keep this in mind.

The Estimates.—By the end of July, 1928, preliminary estimates had been prepared by the various spending agencies and summarized by the Bureau of the Budget. On August 6, General Lord, the Director of the Budget, was able to tell President Coolidge that the tentative expenditure estimates were $208,000 less than the "safety" figure of $3,700,000,000, previously set by the executive. General Lord also brought the disquieting news that there would be a probable deficit of $100,000,000, which he termed a "paper deficit," since he thought the Government's revenues would materialize to such a degree as to exceed the estimate by more than this amount. The regular or final expenditure estimates were prepared by the spending agencies and submitted to the Bureau of the Budget during the early part of September. The staff of the Bureau of the Budget then set to work to prepare the budget.

The Completed Budget.—The 1930 budget was completed and transmitted to Congress by President Coolidge Dec. 5, 1928. It carried proposals for expenditures totaling $3,672,369,904.67, exclusive of $745,000,000 for the Postal Service payable from the postal revenues, making a grand total of $4,417,369,904.67. The revenues available to meet these proposed expenditures were estimated at $3,841,295,829, exclusive of the postal revenues. After deducting the total proposed expenditures, including an amount for the reduction of the public debt required by law to be made from ordinary receipts, or $3,780,719,647, an estimated surplus of $60,576,182 remained. The preceding year's surplus was estimated at slightly under $37,000,000, but according to custom it was not included as a means of financing the budget of the succeeding year. While the 1930 budget was approximately within the total expenditure limit fixed by President Coolidge, it did not take into account the additional and deficiency appropriations of 1929 and prior years which Congress was called upon to make. These appropriations amounted to more than $196,000,000. In addition, large appropriations were made by the special session of Congress which met during the summer of 1929.

Anticipated Revenues.—One may wonder how these increased expenditure requirements are to be met, assuming that the revenue estimates contained in the President's budget represent fairly accurately the future income of the Government. As a matter of fact, the actual receipts have been underestimated every year since the budget system was inaugurated. Usually the receipts have been 7 or 8 per cent above the estimates; in the 1924 budget they were as high as 16 per cent above the estimates and in the 1925 budget they were as low as 2 per cent above the estimates. According to the figures given out by the Treasury Department on June 30, 1929, the ordinary receipts for the 1929 budget were underestimated by $233,752,911. The estimate in the budget was $3,809,497,314 and the actual collections were $4,033,250,225. This continuous underestimating has been the subject of some criticism. There are evidences that Congress has lately come to regard the revenue estimates in the budget as being so conservative that it may exceed them with impunity in making appropriations. This may lead to a serious state of affairs in the finances of the Government. Recent changes in the tax laws add to the difficulties of accurate estimating, but it would seem possible to prepare revenue estimates which would approach the actual receipts to within 5 per cent and keep Congress to this figure.

CONGRESSIONAL ACTION ON BUDGET

Appropriation Bills.—As is customary, the House Committee on Appropriations had been holding hearings on the estimates even before President Coolidge submitted his budget to Congress. Shortly thereafter, this Committee presented to the House several of the regular appropriation bills for its consideration and action. At first these bills were handled with such expedition that the Treasury and Post Office bill passed both houses and was signed by the President Dec. 20, 1928. But later developments, mainly relating to prohibition enforcement, led to a great deal of heated discussion, especially in the Senate, and even to controversy between the two houses. Toward the end of February the Senate threatened to filibuster on some of the important appropriation bills which were yet to be passed. Since this was a short session of Congress, ending March 4, it appeared for a time that the regular appropriations might not be passed. But this situation luckily was resolved in a compromise, March 1, between the Senate and House over the appropriation for the enforcement of prohibition. The appropriation bills, remaining unpassed, went through in the closing days of the session.

Dispute Over Tax Refunds.—On Dec. 11, 1928, President Coolidge sent to Congress a supplemental estimate of $75,000,000 for refunding internal revenue taxes illegally or erroneously collected. The original estimate for this purpose was $130,000,000, which together with the supplemental estimate made $205,000,000. On Dec. 19, Representative Garner of the Ways and Means Committee, attacked the proposal to appropriate this additional amount for tax refunds. He stated that it would absorb the estimated surplus in the budget but that it would place the President in the position of having to reverse his stand. He thought it significant that the largest refunds in history were made in 1925 after the national election, and that after the 1928 election another lot of refunds should come up for action. This charge brought a quick reply from the Treasury Department to the effect that Mr. Garner's statements were "based upon wrong figures which do not fit the facts." On the last day of 1928 a refund of $26,000,000 was made by the Treasury to the United States Steel Corporation in settlement of a claim for taxes represented as having been erroneously collected in 1917. This again stirred up Mr. Garner and certain other members of the Ways and Means Committee who put up a stubborn but losing fight against the appropriation for Treasury refunds. Mr. Garner attacked the appropriation for refunds, describing the Secretary of the Treasury as a "Santa Claus" to the corporations. The appropriation for $75,000,000, however, was duly passed and embodied in the first deficiency bill.

The Prohibition Fight.—Curiously, the prohibition fight assumed a distinctly budgetary aspect. It started in December when Senator Bruce attempted to increase the appropriation for prohibition enforcement carried in the Treasury and Post Office bill from $13,500,000 to $270,627,000. This failed by only three votes. When the first deficiency appropriation came before the Senate in January, it was amended to include $24,000,000 for prohibition enforcement. The House, which was friendly to the Administration, sent the bill to conference. There was extended wrangling, but in the end the House won out and the Senate accepted the bill without the added appropriation for dry enforcement.

Special Appropriations. — Among the more important special bills, carrying large appropriations, were the Boulder Canyon Dam bill and the cruiser bill. The Boulder Canyon Dam bill was passed early in the session and approved by President Coolidge Dec. 21, 1928. Under this bill the National Government is to supply $165,000,000 for construction work in the Black Canyon on the Nevada-Arizona boundary. After prolonged debate, particularly in the Senate, the cruiser bill was passed, authorizing the construction of fifteen 10,000-ton cruisers and one airplane carrier at an estimated cost of $274,000,000. This bill was signed by President Coolidge Feb. 13 after conference with a Congressional delegation. Later it was revealed that an appropriation of $15,000,000 would be sought to start work during the first year on five cruisers and the airplane carrier. On Feb. 14, President Coolidge proposed that the starting of the work be put off until after July 1, 1929, and recommended that $12,370,000 be made available during the fiscal year 1930. The matter appears to be awaiting developments in the event the United States enters into a supplemental agrement for the limitation of naval armament.

APPROPRIATIONS BY SHORT SESSION OF CONGRESS

The short session of Congress which ended March 4, 1929, passed aggregate appropriations for the first time exceeding the budget estimates. The estimates in the 1930 budget, as we have pointed out, totaled $4,417,369,904, to which must be added $239,724,569 of supplemental estimates submitted by President Coolidge during the session, making a grand total of $4,657,094,473. Congress voted appropriations aggregating $4,665,236,768, or an excess over the President's estimates of $8,142,295. Six of the eleven regular appropriation acts were within the estimates. The excess was due mainly to an increase of $3,912,000 in the appropriations of the War Department and to a $11,000,000 increase in the second deficiency bill, of which $7,400,000 was to modernize two battleships. The total amount of appropriations made by the short session exceeded that of the preceding session by $31,000,000. This time it was the regular appropriation acts which ran up the excess. These acts for 1930 exceeded those for 1929 by $166,000,000, the deficiency acts totaled $134,000,000 less than in the previous year. The deficiency acts aggregated $212,000,000.

SUMMARY OF APPROPRIATIONS BY CONGRESS

(Short Session, 1929)

Departments and Offices	1929 and Prior Years	Fiscal Year 1930	Total
Legislative	$ 2,471,223.57	$ 18,866,445.00	$ 21,337,668.57
Executive Office	60,816.00	533,120.00	593,936.00
Independent Offices	12,239,349.68	649,079,611.00	661,318,960.68
District of Columbia	1,029,229.17	41,540,115.00	42,569,344.17
Department of Agriculture	9,985,646.84	159,673,990.00	169,659,636.84
Department of Commerce	1,712,248.36	58,795,609.00	60,507,857.36
Department of the Interior	23,121,409.91	311,346,075.78	334,467,485.69
Department of Justice	2,833,310.25	27,937,370.00	30,770,680.25
Department of Labor	654,853.35	10,774,430.00	11,429,283.35
Navy Department	17,090,781.58	362,061,247.00	379,152,028.58
Post Office Department payable from Treasury	27,741.80	—	27,741.80
Post Office Department and Postal Service payable from postal revenues	23,889,495.20	818,235,725.00	842,125,220.20
Department of State	1,058,496.21	14,767,445.68	15,825,941.89
Treasury Department	84,847,351.95	1,535,613,444.82	1,620,460,796.77
War Department	15,191,408.89	459,798,777.00	474,990,185.89
Total	$196,213,362.76	$4,469,023,405.28	$4,665,236,768.04
Deduct Post Office Department and Postal Service payable from postal revenues	23,889,495.20	818,235,725.00	842,125,220.20
Total, exclusive of Post Office Department and Postal Service payable from postal revenues	$172,323,867.56	$3,650,787,680.28	$3,823,111,547.84

APPROPRIATIONS BY SPECIAL SESSION

The special session of Congress called in April, 1929, by President Hoover to consider farm relief and tariff revision passed several bills carrying appropriations, the total of which is well over $200,000,000. The largest of these appropriations was passed on June 17, for the operation of the newly created Federal Farm Board. It amounted to $151,500,000. Of this total, $150,000,000 is the initial installment of a $500,000,000 revolving fund and $1,500,000 is for the administrative expenses of the Board until June 30, 1930. Several other smaller appropriations were made, among which may be mentioned $39,000,000 for additional compensation to the railways for carrying the mails, $5,200,000 for payment of Court of Claims' judgments, $4,250,000 for the eradication of the Mediterranean fruit fly in Florida, $3,000,000 for the purchase of Federal building sites in the District of Columbia, and $877,000 for increase of salaries of employees in Congress.

EXECUTION OF THE 1929 BUDGET

Fiscal Condition of Government.—President Coolidge was much concerned about the fiscal condition of the Government at the beginning of the period covered by the 1929 budget with estimated receipts of $3,707,000,000 and estimated expenditures $3,801,000,000. About two months after the opening of the 1929 budget period, General Lord, the Budget Director, estimated that the period would end with a deficit of over $94,000,000. This was bad news in view of the national campaign which was then starting. Furthermore, it did not speak well for the Coolidge régime of economy. But General Lord was frank about it. Two days later President Coolidge told the newspaper reporters that he was disturbed by the looming deficit and that he would cope with it by cutting down the expenses of the Government. He announced that he would summon the department and bureau heads and demand that they reduce expenditures, but the situation began to look brighter, so things were allowed to run along about as before. By December the anticipated deficit had changed to an estimated surplus of nearly $37,000,000, and President Coolidge dwelt on this condition in his message on the 1930 budget. This estimated surplus turned out on June 30, 1929, according to the figures of the Treasury Department, to be a real surplus of $184,787,035, and was applied to the retirement of public debt obligations.

January "Business" Meeting.—The sixteenth semi-annual meeting of the "Business Organization of the Government" was held in Memorial Continental Hall Jan. 28, 1929. This one is notable, since it is perhaps the last meeting of its kind to be held. President Hoover did not hold a meeting in June as had been customary in previous years. At the January meeting both President Coolidge and General Lord made addresses. The President's address was largely reminiscent of governmental finances and methods during his seven years in office. General Lord told more and better stories than ever before. He was indeed genial, so much so that the *New York Times* was prompted to say editorially: "Not since the 'Tithing Man' of the Anti-Jacobin, who with such glee laid double taxes and penalties upon the Duke, have we had a man who could play with the public income, and grant or refuse money to congressmen and department heads, in such lightsome spirit as that exhibited by General Lord." The General viewed the development of the budget system and growth of national expenditures, making the significant statement that the 1927 outgo was "the lowest expenditure level this government will ever see."

ECONOMY AGENCIES

More "Economy Clubs."—General Lord originated the idea of "economy clubs" in the National Government. Prior to Jan. 28, 1929, he had established five such clubs, of which the Woodpecker Club was the latest addition. On that date he proposed a sixth, the Federal Casualty Club, to extend over the remainder of the 1929 budget period. Membership was acquired in this club by letting all vacancies remain unfilled up to and including June 30, 1929, "thereby contributing toward a balanced budget the far from negligible sum of $12,500,000." Of the economies resulting from the Woodpecker Club he spoke feelingly at the January meeting of the "Business Organization of the Government."

Coördinating Work.—The Federal coördination agencies consist of the Chief Coördinator, coördinating boards, and area coördinators. The office of Chief Coördinator was created by executive order in 1921. Starting about the same date, coordinating boards were created from time to time until there are twelve such boards at present. They consist of representatives of the various departments. There are nine area coordinators who work in territories corresponding to the nine corps areas of the army. These coördinators are assisted by about 280 active Federal business associations scattered throughout the United States. The coördinating boards are mainly concerned with the improvement and standardization of governmental procedure at the capitol. The area coordinators supervise governmental operations in the field. Chief Coördinator, Rear Admiral H. H. Rousseau, issued a statement in July, 1929, in which he outlined the work his office had accomplished and pointed to savings in interdepartmental service since its creation of more than $12,000,000. Aside from this amount, he asserted that his office had realized from surplus war supplies more than $143,000,000.

General Lord Resigns.—On May 31, 1929, General Lord resigned as Director of the Budget to enter private business after about seven years' service in this office. He was succeeded on August 15 by Colonel J. Clawson Roop. Colonel Roop is the third incumbent of this office; he was Assistant Director of the Budget under General Dawes. In the interim, Assistant Director of the Budget, R. O. Kloeber, was acting director.

BUDGETARY CONTROL

Methods of Control.—The execution of the 1929 budget saw no new developments in the methods of budgetary control by the administration. The apportionment or allotment of appropriations by the departments and offices was continued as in the previous budget period. These apportionments, made on a quarterly basis, were filed with the Budget Bureau at the opening of the budget period, any subsequent changes in them requiring the filing of a "waiver" by the department or office concerned. Each department or office was required to submit to the Budget Bureau a quarterly report, showing the amount of obligations, actual or authorized, against each apportionment for the quarter just ended, and the amount actually obligated under the corresponding apportionment for the preceding quarter. In this way the Budget Bureau can follow the actual rate of expenditure in the various departments and offices. It may caution the spending officers, if they appear to be running ahead of their apportionments, but it has no legal authority to check them in spending their appropriations. Real budgetary control is yet to be developed in the National Government.

The General Accounting Office.—The existing financial organization, more particularly the position of the General Accounting Office, offers certain structural difficulties in developing budgetary control. The General Accounting Office was created along with the Budget Bureau in 1921. It is under the Comptroller General, who is, in effect, responsible only to Congress. This office is therefore a legislative, rather than an executive, agency. Already it has grown to be a vast establishment, employing nearly 2,000 persons and spending approximately $4,000,000 a year for its support.

SETTLEMENT OF CLAIMS

Under the budget and accounting act of 1921, the Comptroller General has authority not only to control all treasury receipts and issues but also to settle all claims either against or due the national government. His control over treasury receipts and issues is more or less a routine matter, and may be said to be within the province of an independent auditing officer. But his authority to settle all claims either for or against the Government is not clearly within his province, and besides, it is of great significance from the standpoint of developing budgetary control under the executive. The settlement of claims by the Comptroller General is accomplished through the process of a postaudit—more recently a preaudit in some instances—of all bills, statements, or vouchers. No settlement is final without his approval. At the same time, he acts as his own auditor, for he makes settlements as comptroller which he in turn verifies and approves as final without subsequent review. If the present trend of development is followed, the Comptroller General's office—the General Accounting Office—will become not only what its name implies, that is, a central accounting establishment for the Government, but much more; it will become the national department of finance. As such, it will be the office which will ultimately exercise budgetary control. And it will be completely removed from executive direction.

The President and Budget Control.—The Treasury Department is now little more than an agency for the collection, custody and disbursement of moneys. The Budget Bureau, as we have stated above, is legally without power to see that the budget is properly executed. Indeed, the President has no central accounting and controlling agency under his direction. At the present time, he must depend upon the several administrative departments and offices to carry out the expenditure plan of the Government. Each one of these, as we know, is more or less afflicted with financial myopia; it sees only its own requirements, usually to the exclusion of the departments of the Government as a whole.

PUBLIC DEBT OF THE UNITED STATES

By Francis H. Sisson

Vice President, Guaranty Trust Company of New York

GROSS DEBT

Reduction.—The total gross debt of the United States Government at the close of the last fiscal year on June 30, 1929, amounted to $16,931,000,000, as compared with $17,604,000,000 at the close of the fiscal year 1928, showing a decrease of $673,000,000. Of the amount retired, $549,000,000 was attributable to the sinking fund and other debt retirements chargeable against ordinary receipts, and $124,000,000 was attributable to debt retirement from the surplus of receipts over expenditures.

The reduction of $673,000,000 in the public debt during the fiscal year compared with one of $907,000,000 in 1928 and brought the total amount of the debt below $17,000,000,000 for the first time since the war.

Interest Rate and Payments.—The annual rate of interest on the interest-bearing debt on June 30, 1929, was 3.94 per cent, as compared with 3.87 per cent at the close of the fiscal year 1928. This slight increase was due to the high coupon rate carried by short-term securities issued during the course of the last six months of the fiscal year, in which period tightening credit conditions compelled the Government, as well as other borrowers, to pay higher rates for money. Total interest payments in the fiscal year 1929 were $678,000,000, as compared with $732,000,000 in 1928. The saving in interest charges was, therefore, $54,000,000.

Public debt retirements chargeable against ordinary receipts, amounting to $549,000,000, compared with $540,000,000 in the preceding fiscal year. The sinking fund accounted for $370,000,000, as against $355,000,000 a year earlier; purchases and retirements from foreign repayments to only $571,000, as against $19,000,000; amounts received from foreign governments under debt settlements to $176,000,000, as against $163,000,000; purchases and retirements from franchise tax receipts from Federal Reserve and Federal intermediate credit banks to $3,000,000, as against

$618,000; and forfeitures, gifts, etc., to $160,000, as against $3,000,000.

PUBLIC DEBT CLASSIFICATION

Pre-war Bonds.—Of the total gross debt on June 30, 1929, $16,639,000,000 was interest-bearing debt. Prewar bonds accounted for only $770,000,000 of the total, the principal item in this classification being $600,000,000 of 2 per cent Consols of 1930.

Liberty Bonds.—The largest bond item was $8,218,000,000 of bonds of the first and fourth Liberty loans, the other Liberty bonds having all been retired. Bonds of the fourth Liberty loan accounted for $6,278,000,000 of the total, while the remainder, amounting to $1,939,000,000, consisted of first Liberty bonds and other issues into which such bonds had been converted.

Treasury Bonds and Notes.—Treasury bonds contributed $3,137,000,000 to the total, the largest of the five classifications under this head being the 4 per cent bonds of 1944-54, amounting to $1,037,000,000. Treasury notes, including adjusted service, civil service retirement fund, and foreign service retirement fund notes, reached a total of $2,861,000,000. In this group there were no less than thirteen items; more than half of the total amount, however, consisted of series A, B, and C notes of 1930-32, series A alone amounting to $1,138,000,000.

Certificates of indebtedness, all maturing in 1929 and 1930, aggregated $1,640,000,000, with the amount fairly evenly divided among the five groups represented. These items, together with $13,000,000 in Treasury savings certificates, comprised the entire interest-bearing debt. The remainder of the debt consisted of $51,000,000 of matured debt on which interest had ceased, including securities of various issues not yet presented for payment; and $242,000,000 of debt bearing no interest, consisting mostly of United States notes and other currency.

Interest rates on the various issues ranged from 2 per cent on the Consols of 1930 and the first two issues of Panama Canal bonds to 5⅛ per cent on the series TM certificates of indebtedness of 1930. The only long-term issues bearing more than 4 per cent were Liberty loan and converted issues, and one issue of Treasury bonds. These obligations are redeemable at various dates from 1932 to 1952.

Short-Term Bills.—A new form of Government security was authorized by the law signed by the President on June 17, 1929. This law amends the Second Liberty Bond Act and provides for the issuance of short-term Treasury bills to be sold on a discount basis. Such bills are to be paid at maturity without interest and are to be offered for sale on a competitive basis.

TREASURY FINANCING

Third Quarter Offering.—This method, however, was not followed by the Treasury in its quarterly financing operations of September 15. The only securities offered were $500,000,000 of 4⅞ per cent, Treasury certificates of indebtedness maturing June 16, 1930. Total subscriptions to this issue amounted to $1,486,492,000, while the allotments were $549,707,500. In commenting on the large subscriptions received, the Secretary of the Treasury attributed public interest in the offering to a broadened investment market made possible by the tax-exemption privilege enjoyed by the issue. Such a privilege is of great advantage only to individuals with large incomes, and it was believed that a greater proportion than usual of the subscriptions were received from such sources. The resulting diffusion of Government issues is considered beneficial, since it is less likely that a quantity sufficient to depress the value will be thrown on the market at any one time when the securities are widely held. In order to further the diffusion of holdings of the certificates, large subscribers were allotted a lower proportion of the amount subscribed for than the smaller ones.

Innovation in Sinking Fund Purchase.—Another innovation in financial methods of the Treasury was seen early in the current fiscal year.

It was announced on July 10 that the acting Secretary of the Treasury had authorized the Federal Reserve Banks to purchase, at the option of holders, for the account of the sinking fund of the United States Treasury, approximately $75,000,000 in 3½ per cent Treasury notes of series A, 1930-32, at 98 and accrued interest. The customary way for such transactions to be handled is for the Treasury to buy the securities in the open market, either directly or through the Federal Reserve Banks. In the present instance, holders were given an opportunity to tender the securities at a fixed price, which was the current asked price in the open market.

The new method was interpreted as an effort on the part of the Treasury to acquire the securities without incurring the risk of running up the price, which might have resulted if the securities had been purchased in the usual way. The purchase was made with the residue of the surplus of $185,000,000 with which the Treasury closed the preceding fiscal year. The unusual method of handling the transaction attracted considerable attention and gave rise to speculation as to whether the Treasury was attempting to ease the money market by injecting funds in this manner. Since such an action would have been in apparent conflict with the open-market policy of the Federal Reserve Banks, it was even suggested that the Treasury and the Federal Reserve system might be working at cross purposes. Such suggestions, however, were not considered seriously, the general belief being that the action of the Treasury had no purpose other than to retire a portion of the public debt in as economical a manner as possible.

PRESENT STATUS OF THE PUBLIC DEBT

Comparisons.—The present status of the public debt is best shown by a comparison with the totals for past years. The national debt of the United States is almost entirely a war debt. The highest total ever reported at the end of a fiscal year prior to the World War was $2,756,000,000 on June 30, 1866, shortly after the close of the Civil War. Before the end of the nineteenth century the amount of the debt had been reduced below $1,000,000,000. The fiscal year 1917, which witnessed the entry of the United States into the World War, closed with a total gross debt of less than $3,000,000,000. By August 31, 1919, the debt had increased to $26,597,000,000, the highest total ever reached. Since that time the debt has been reduced steadily year by year.

Debt Retirement Sources.—In the early post-war years, several sources of funds for debt retirement were available, most of which have now been exhausted. One of the most important was the reduction of the cash balance in the Treasury from a war-time to a peace-time basis. Another was the series of large budgetary surpluses due to the continuing high rate of taxation. A third was the money received from foreign governments on account of their debts to the United States Government. The fourth important source of funds was the sinking fund created by Congress for the purpose of retiring the debt.

Of these sources, the reduction of the Treasury balance has, of course, been exhausted; and it is the avowed intention of the Government to reduce taxation as fast as conditions permit, holding down the annual budgetary surplus to the minimum compatible with safety. The two remaining important sources are the sinking fund and the payments received from foreign governments. The proportion of the latter that will be available for debt retirement is uncertain, depending on the form in which the payments are made and the general cash position of the Treasury. The sinking fund, on the other hand, is a more or less fixed and certain resource, though its amount cannot be exactly foretold, depending as it does on the prices paid for bonds, the average interest rate on bonds retired, and the interest-payment dates on the bonds. The progress already made in debt retirement, however, gives reasonable assurance that the sinking fund, together with such sums as may become available from foreign debt payments, will provide for a steady and fairly swift reduction in the amount of the debt.

INTER-ALLIED DEBTS

French Ratification.—The outstanding event of the past year in connection with the debts of foreign governments to the Government of the United States was the ratification of the Mellon-Bérenger debt-funding agreement by the French Parliament in July. Under the agreement, France undertakes to pay $4,025,000,000 over a period of 62 years, of which amount $685,000,000 is accrued interest. The first two annuities are to be of $30,000,000 each, and the amounts of the yearly payments thereafter increase gradually until the maximum of $125,000,000 is reached in 1942. The $125,000,000 payments continue until 1986, and in 1987 the final payment is to be made.

Terms of French Agreement.—In drawing up the compact, the obligations of France were first calculated as aggregating $3,378,471,097.64 on December 15, 1922, made up of $2,933,405,070.15 in cash advanced under the Liberty Loan Acts and accrued interest at 4¼ per cent. To this total was added the sum of $407,341,145.01 owed to this country by France for the purchase of surplus war supplies, with accrued interest of $6,324,940.79. This gave a total indebtedness as of December 15, 1922, of $3,792,137,183.44. Interest on this sum calculated from December 15, 1922, to June 15, 1925, at 3 per cent brought the total to $4,076,547,472.19. Credits due France cut this down to $4,025,396,689.89, and France agreed to make a cash payment bringing the total indebtedness to be funded in bonds down to $4,025,000,000. On this total, France contracted to pay during the period from June 15, 1925, to June 15, 1930, inclusive, only installments of principal amounting to $30,000,000 each during the first and second years, $32,500,000 each in the third and fourth years, and $35,000,000 in the fifth year. Thereafter, France is to pay increasing installments in liquidation of principal for fifty-seven more years, and also interest for fifty-seven years at 1 per cent for ten years, 2 per cent for the next ten years, 2½ per cent for the next eight years, 3 per cent for the next seven years, and 3½ per cent for the remaining twenty-two years. Under this arrangement the debt would be liquidated in the sixty-two-year period by the payment of $2,822,674,104.17 in interest, and the repayment of the full principal amount of $4,025,000,000, a total of $6,847,674,104.17.

Status of Foreign Debts to U. S.—With the ratification by the French Parliament of the debt-funding agreement, fourteen European nations have formally approved contracts under which they obligated themselves to pay to this country $22,163,869,993.10 in liquidation of the principal amount and in interest on advances resulting from the World War. All the foreign indebtedness to the United States Government is thus funded or otherwise provided for except that of Russia, to which loans aggregating $187,729,750 were extended. Since this Government does not officially recognize the present Russian Soviet Government, negotiations for the funding of that debt have been impossible. The aggregate funded principal of the fourteen debts was fixed at $11,542,684,000. If final liquidation is accomplished over the period of 62 years as provided, without any further concessions being made for revisions, the foreign nations will in the end have repaid this principal amount, plus $10,621,185,993.10 in interest, at varying rates, these two items making the grand total equal the sum of $22,163,869,993.10.

Great Britain, which agreed to return in principal and interest a total of $11,105,965,000 on her funded debt of $4,600,000,000, bears the heaviest burden. She contracted to pay interest at 3 per cent for ten years and at 3½ per cent for the following fifty-two years. France comes next with a total repayment of $6,847,674,104.17 on a funded debt of $4,025,000,000, having been granted a concession of interest rates which, over the sixty-two years, averaged 1.64 per cent.

Average interest rates which the various countries will pay over the period of the funding are as follows, the lower rates representing cases where the debt negotiators of the United States were convinced that a showing of leniency should be made: Belgium, 1.79 per cent; Czechoslovakia, 3.327; Estonia, 3.306; Italy, 0.4045; Latvia, 3.306; Lithuania, 3.306; Poland, 3.306; Rumania, 3.321; Yugoslavia, 1.030. These average interest rates are calculated on the debts as founded. Except in the cases of Belgium, France, Italy, and Yugoslavia, the rates were virtually the same as those fixed by the principle laid down in funding the British debt. In the instance of Greece, the funding agreement provided only for repayments of principal. The total of the debt to be funded was $18,125,000, but bonds were accepted totaling $20,330,000, and no mention of interest payments was made. The difference between these two amounts would represent interest over sixty-two years at a rate slightly in excess of that charged Italy, but the Treasury records do not give such a calculation.

Foreign Debt Payments.—The nations combined have already paid about $1,100,000,000 in principal and interest, practically all of it by Great Britain, since the early payments under funding agreements by most of the other nations have been very light. France paid about $20,000,000 interest annually from 1919 to 1926 on a surplus war supplies debt of $407,000,000, which will be merged with the Mellon-Bérenger agreement.

New Greek Loan.—As a by-product of the agreement made with Greece for the funding of its war-time obligations, the United States extended an additional loan of $12,167,000, which Greece has agreed to repay as a purely commercial debt within the next twenty years at 4 per cent interest. The total payments on this debt will amount to $17,790,760. Because it was based on a new loan made this year to Greece, the figures are not included in the debt totals directly attributable to war loans.

CLASSIFICATION OF FOREIGN DEBTS

Bonds Held Under Funding Agreements.—The official statement of securities owned by the United States Government on June 30, 1929, included foreign obligations amounting to $10,897,564,066.83. Of this total $7,257,927,794.93 consisted of bonds of foreign governments received under agreements for funding of their debts to the United States. Twelve government debts were listed under this classification, including that of Great Britain, amounting to $4,453,000,000; Italy, $2,022,000,000; Belgium, $408,180,000; and Poland, $178,560,000. The other countries under this classification were Estonia, Finland, Greece, Hungary, Latvia, Lithuania, Rumania, and Yugoslavia.

Liberty Loan Advances.—The second classification, amounting to $3,161,211,695.19, included obligations of foreign governments on account of advances under the Liberty Loan Acts. The principal item was the French debt, amounting to $2,911,507,904.09, with smaller amounts owed by Czechoslovakia and Russia. Although Czechoslovakia has reached a funding agreement with the United States Government, the bonds called for by the agreement have not yet been delivered. Greece and Yugoslavia delivered their bonds during the last fiscal year. Upon the ratification of the French debt-funding agreement by the United States Congress, the French bonds will presumably be delivered and the French debt accordingly transferred into the first classification.

War Supplies Obligations.—The third group of foreign debts consisted of obligations received by the Treasury from the Secretary of War on account of surplus war supplies. This item amounted to $428,642,157.79 and included, in addition to the French debt of $407,341,145.01, smaller amounts owed by Czechoslovakia, Nicaragua, and Russia. The amounts due from France and Czechoslovakia are covered by the respective debt-funding agreements with those countries and will be transferred to the first group upon the delivery of the bonds.

Miscellaneous Obligations. — The other two classifications of foreign indebtedness were relatively small, amounting, respectively, to $18,921,966.41 and $30,860,452.51. They included obligations received by the Treasury from the American Relief Administration on account of relief extended to Armenia, Czechoslovakia, and Russia, and from the United States Grain Corporation on account of final liquidation, given for relief to Armenia, Austria and Czechoslovakia.

FOREIGN DEBT PAYMENTS

Receipts of the United States Treasury on account of foreign obligations during the fiscal year ended June 30, 1929, amounted to $38,790,661 for principal repayments and $160,340,908 for interest payments. These amounts compared with $47,841,167 received for principal and $161,084,776 for interest during the preceding fiscal year. The greater part of the total consisted of payments received on December 15, 1928, and June 15, 1929, for installments of principal and interest under the debt-funding agreements. As has been true in recent years, a large proportion of the aggregate amount received was from Great Britain. The total on December 15 was $98,612,203.02, consisting of $94,200,000 from Great Britain, of which $67,200,000 represented interest and $27,000,000 principal; $1,500,000 from Czechoslovakia; $1,250,000 each from Belgium and Poland; $183,460 from Finland; $100,000 from Estonia; $48,970.01 from Lithuania; $40,000 from Latvia; and $39,773.01 from Hungary. Payments on June 15 totaled $80,109,385.95 and included $66,795,000 from Great Britain, $5,000,000 from Italy, $4,200,000 from Belgium, $1,500,000 from Czechoslovakia $125,000 from Estonia, $130,680 from Finland, $28,973.40 from Hungary, $45,000 from Latvia, $84,732.55 from Lithuania, $1,500,000 from Poland, $500,000 from Rumania, and $200,000 from Yugoslavia. Most of the total sum represented by these payments was received in the form of United States Government obligations and accrued interest thereon. The obligations received were immediately retired from the public debt.

FUNDED PRINCIPALS OF FOREIGN DEBTS

The following table shows the funded principal of each of the debts of foreign countries to the United States Government, together with the interest thereon and the total amount to be received.

Country	*Funded Principal*	*Interest to Be Received*	*Total*
Belgium	$ 417,780,000	$ 310,050,500.00	$ 727,830,500.00
Czechoslovakia	115,000,000	197,811,433.88	312,811,433.88
Estonia	13,830,000	19,501,140.00	33,331,140.00
Finland	9,000,000	12,695,055.00	21,695,055.00
France	4,025,000,000	2,822,674,104.17	6,847,674,104.17
Great Britain	4,600,000,000	6,505,965,000.00	11,105,965,000.00
Hungary	1,939,000	2,754,240.00	4,693,240.00
Italy	2,042,000,000	365,677,500.00	2,407,677,500.00
Latvia	5,775,000	8,183,635.00	13,958,635.00
Lithuania	6,030,000	8,501,940.00	14,531,940.00
Poland	178,560,000	257,127,550.00	435,687,550.00
Rumania	44,590,000	77,916,260.05	122,506,260.05
Yugoslavia	62,850,000	32,327,635.00	95,177,635.00
Greece	20,330,000	....	20,330,000.00
	$11,542,684,000	$10,621,185,993.10	$22,163,869,993.10

PRESENT FOREIGN INDEBTEDNESS TO UNITED STATES

The following table shows the indebtedness of foreign governments to the United States Government on June 30, 1929, the end of the last fiscal year. The table will be found on page 170.

An examination of these figures shows that, after the ratification of the French debt-funding agreement by the United States Congress, less than $201,000,000 of the indebtedness of foreign governments to the United States Government will remain unfunded. Aside from the Russian debt, the status of which is extremely uncertain, the unfunded indebtedness amounts to only about the sum of $8,000,000.

Belgium	$ 408,180,000.00	
Esthonia	13,830,000.00	
Finland	8,712,000.00	
Great Britain	4,453,000,000.00	
Greece	32,457,000.00	
Hungary	1,931,560.00	
Italy	2,022,000,000.00	
Latvia	5,775,000.00	
Lithuania	6,271,674.50	
Poland	178,560,000.00	
Rumania	65,160,560.43	
Serbs, Croates and Slovenes	62,050,000.00	
		$ 7,257,927,794.93
Obligations of foreign governments on account of loans made under the Liberty Loan Acts:		
Czechoslovakia	$ 61,974,041.10	
France	407,341,145.01	
Russia	187,729,750.00	
		3,161,211,695.19
Foreign obligations received from the Secretary of War on account of sale of surplus war supplies:		
Czechoslovakia	$ 20,604,302.49	
France	407,341,145.01	
Nicaragua	290,627.99	
Russia	406,082.30	
		428,642,157.79
Foreign obligations received from the American Relief Administration on account of relief:		
Armenia	$ 8,028,412.15	
Czechoslovakia	6,428,089.19	
Russia	4,465,465.07	
		18,921,966.41
Foreign obligations received from the United States Grain Corporation on account of final liquidation, given for relief:		
Armenia	$ 3,931,505.34	
Austria	24,055,708.92	
Czechoslovakia	2,873,238.25	
		30,860,452.51
		$10,897,564,066.83

STATE FINANCE

By Merlin H. Hunter

Professor, University of Illinois

THE TREND OF STATE EXPENDITURES

Rapid Increase.—The continued emphasis upon entrenchment in public expenditures seems to have little effect upon the trend of the expenditures of the forty-eight states. The increase in the expenditure of the states has been more rapid than that of the Federal Government and that of cities, although as a total the expenditure is less than either of the latter. The expenditures of the states reaches between 15 and 20 per cent of the expenditures of all governmental bodies.

Comparison with Federal Expenditures.—The actual trend of the expenditures of the states compared with that of the Federal Government, is shown by the following figures taken from the 1927 Census publication, *Financial Statistics of States:* For the governments of the forty-eight states the expenditures for operation, maintenance, interest, and outlays for permanent improvements increased from $1,513,628,000 in 1924 to $1,614,562,000 in 1925, decreased to $1,614,583,000 in 1926, and increased to $1,726,989,000 in 1927. This was an increase of 6.7 per cent, a decrease of less than one-twentieth of one per cent, and an increase of seven per cent, respectively. The total expended and obligated by the Federal Government, exclusive of the payments on account of debt and other items not included in the totals for state governments, was $3,315,237,000 in 1924, $3,326,033,000 in 1925, $3,374,459,000 in 1926, and $3,319,622,000 in 1927 this being an increase of 0.3 per cent, 1.5 per cent and a decrease of 1.5 per cent respectively.

Functional Increase.—The total increase in the expenditures of the states for different functions since 1915, together with the percentage increase over 1915 is shown in the following table:

INCREASE IN STATE EXPENDITURES

(000 omitted)

	Total		Operation & Maintenance		Interest		Outlays	
Year	Amount	% increase over 1915	Amount	% increase over 1915	Amount	% increase over 1915	Amount	% increase over 1915
1927....	$1,726,989	249	$1,129,480	196.3	$78,722	324.5	$518,788	445
1926....	1,614,538	226.2	1,049,311	175.3	76,869	314.5	488,358	413
1924....	1,513,628	205.8	1,012,504	165.6	55,848	201.1	445,276	367.8
1922....	1,280,320	158.7	920,967	141.6	41,308	122.7	318,045	234.1
1919....	640,403	29.4	545,178	43.0	24,079	29.8	71,145	25.3
1917....	517,503	4.6	428,439	12.4	21,153	14.1	67,911	28.7
1915....	494,907	....	381,168	....	18,546	....	95,193	....

Items of State Expenditure.—The Bureau of the Census divides the operation and maintenance charges into a number of items, the most important of which are general government, protection to person and property, development and conservation of natural resources, health and sanitation, highways, charities, hospitals and corrections, schools, libraries, and recreation. These various items have not from year to year occupied a place of the same relative importance. The recent emphasis upon highway construction has increased the importance of highway expenditures. In some individual states the expenditure for highways exceeds that for any other item. The table on page 172 indicates the total expenditure, the per capita expenditure, and the percentage distribution for the above items of important and necessary state activities.

Educational Expenditures.—The preceding tables indicate the large part of the state expenditures which go for schools, charities, hospitals and corrections, and highways. The large increase in enrollment in public educational institutions has meant a rapid increase in costs. Of the total expenditure for education, however, about sixty-five per cent is appropriated to minor divisions, as counties, cities, or townships. In some states the amount so appropriated is large, while in others no funds are so used. This helps to account for the lack of uniformity in the expenditure for education among the different states.

Charity and Health.—The item for charities, hospitals and corrections is the most discouraging of all state expenditures. The number of these "human culls" seems to be increasing more rapidly than adequate provision can be made even with the large increase in expenditures. One reason for the large expenditure by states is that few institutions for these classes are provided by the other political units. The principal items under charities are poor in institutions, care of children, and care of blind, deaf, and mute; under hospitals, general, insane and feebleminded; and under corrections institutions for adults and minors. The expenditures for conservation of health and sanitation deal with vital statistics, prevention of tuberculosis and other diseases, conservation of child life, food regulation and inspection and regulation of professional occupations.

Natural Resources.—The growth of expenditures for highways needs no comment. That the burden has been shouldered almost in its entirety by the motoring public in the form of license fees and gasoline taxes has meant little change in the ordinary sources of revenue. The item of development and conservation of natural resources is one of increasing importance. Under this is placed such activities as extension service, experiment stations, agricultural

EXPENDITURES OF STATES FOR SPECIFIED ITEMS
(000 omitted)

Year	General Government			Protection to Person and Property			Development and Conservation of Natural Resources			Health and Sanitation		
	Total	Per capita	% of total	Total	Per capita	% of total	Total	Per capita	% of total	Total	Per capita	% of total
1927....	$99,759	$0.85	8.9	$63,770	$0.55	5.7	$64,599	$0.55	5.8	$27,825	$0.24	2.5
1926....	86,870	0.75	8.4	59,747	0.52	5.8	62,696	0.54	6.0	25,549	0.22	2.4
1924....	74,583	0.67	7.4	50,998	0.46	5.1	53,189	0.48	5.3	23,057	0.21	2.3
1922....	71,288	0.66	7.8	52,738	0.49	5.7	42,021	0.39	4.6	21,996	0.20	2.4
1919....	52,152	0.50	9.6	34,102	0.33	6.3	24,360	0.23	4.5	14,404	0.14	2.7
1917....	45,414	0.45	10.7	30,298	0.30	7.1	18,999	0.19	4.5	11,257	0.11	2.6
1915....	44,508	0.45	11.7	26,295	0.27	6.9	16,559	0.17	4.4	9,454	0.10	2.4

Year	Highways			Charities, Hospitals and Corrections			Schools			Recreation		
	Total	Per capita	% of total	Total	Per capita	% of total	Total	Per capita	% of total	Total	Per capita	% of total
1927....	$170,793	$1.46	15.2	$193,225	$1.65	17.3	$444.883	$3.79	39.7	$4,039	$0.03	0.4
1926....	156,639	1.35	15.1	178,580	1.54	17.2	413,074	3.57	39.7	3,542	0.03	0.3
1924....	123,308	1.11	12.3	165,216	1.49	16.5	368,908	3.32	36.8	2,517	0.02	0.3
1922....	106,337	0.98	11.6	162,469	1.50	17.7	329,863	3.05	35.9	1,870	0.02	0.2
1919....	61,628	0.59	11.4	134,056	1.28	24.7	183,200	1.74	33.8	1.212	0.01	0.2
1917....	33,631	0.33	7.9	103,434	1.02	24.3	160,086	1.57	37.5	1,091	0.01	0.3
1915....	22,768	0.23	6.0	89,189	0.91	23.5	145,832	1.48	38.5	879	0.01	0.2

associations, livestock, reclamation, forestry, fish and game, and geological survey. While the total expenditure for protection is not large it is made for such items as regulation of the sale of oil and gas, of weights and measures, of immigration, the inspection of labor in mines and factories, and protection through the fire warden and prohibition enforcement.

STATE REVENUE

Sources.—The increase in state expenditures has meant an increase in revenues. These have been furnished by relying more heavily upon sources already in use and by inaugurating new sources. According to the report of the Bureau of the Census, *Financial Statistics of States*, the total revenue receipts for the states for 1927 were $1,758,381,000, distributed as shown, page 173.

General Property Tax.—These tables indicate that the general property tax, long the bulwark of state revenue, continues to lose favor. The situation, however, is that certain individual states have given up property as a source of revenue, while others still rely extensively upon it. In 1927 Pennsylvania and North Carolina reported no receipts from the general property tax; California reported only receipts from levies of prior years while the only use made of the general property tax by Delaware was for schools. New York continues to tax property only for a few specific purposes while Wisconsin has withdrawn real and personal property as a base for state taxes.

Special Taxes.—Receipts from special property taxes were reported by thirty-two states. More than seventy-seven per cent of these were in Massachusetts, New York, Pennsylvania, Ohio, Michigan and California. Inheritance taxes made a part of these in forty-five states and income taxes in twelve states. Other special taxes came from incorporation or organization taxes, stock transfer taxes and taxes upon certain classes of public utilities.

Poll and Business Taxes.—Poll taxes are of less importance now than shortly after the War when they

REVENUE RECEIPTS OF STATES, 1927

(000 omitted)

General property taxes	$370,435
Special property taxes	301,943
Poll taxes	3,426
Business and non-business taxes	697,324
Special assessments	27,078
Fines, forfeits and escheats	7,912
Subventions and grants	$138,770
Highway privileges	81,922
Earnings of general departments	134,881
Earnings of public service enterprises	12,692

PER CAPITA RECEIPTS OF STATES

Year	General Property		Special Property		Business and non-business license		Poll		Earnings of general depts.		Subventions, grants, etc.		Other	
	Per capita	%	Per capita	%	Per capita	%	Per capita	%	Per capita	%	Per capita	%	Per capita	%
1927...	$3.16	21.1	$2.57	17.2	$5.79	38.6	$0.03	0.2	$1.15	7.7	$1.18	7.9	$1.11	7.3
1926...	3.24	22.7	2.32	16.2	5.32	37.2	0.03	0.2	1.12	7.8	1.20	8.4	1.05	7.5
1924...	3.16	25.7	2.04	16.6	3.91	31.8	0.03	0.3	1.02	8.3	1.20	9.8	0.94	7.7
1922...	3.22	30.0	1.81	16.9	2.82	26.3	0.08	0.7	1.08	10.1	1.02	9.5	0.69	6.3
1919...	2.26	35.1	1.17	18.2	1.57	24.5	0.02	0.3	0.79	12.3	0.16	2.5	0.45	7.0
1917...	1.80	34.9	1.08	21.2	1.12	21.9	0.02	0.4	0.61	12.0	0.11	2.1	0.39	7.5
1915...	1.89	40.6	0.84	18.2	0.95	20.3	0.03	0.7	0.51	11.0	0.08	1.6	0.35	7.6

were used by some states to provide funds for a soldiers' bonus. In 1927 only eleven states reported receipts from poll taxes. One of the most important items under business taxes is the tax upon motor fuel, now found in every state. The most important source of revenue from licenses is the levy upon motor vehicles.

STATE TAX LEGISLATION

Income Tax.—The legislatures of forty-three states were in session in 1929 and, as might be expected, there was a large amount of fiscal legislation. One source of revenue which seems to be commanding more and more attention is the income tax. Income tax laws were passed in Arkansas, Tennessee, and Georgia, while Oregon has again submitted an income tax to referendum. The rate on personal incomes in Arkansas ranges from 2 to 5 per cent, while there is a tax of 2 per cent on the net income of corporations. The rates in Georgia are placed at one-third those levied by the Federal Government while a gross income tax is placed upon business, varying with the type of business. A vote upon a constitutional amendment authorizing an income tax is allowed in Kansas while North Dakota now accords similar treatment to residents and non-residents. In New York the exemptions were changed to $2500 and $4000 Income taxes drew forth much discussion in other states and undoubtedly further legislation will result in the future.

Inheritance Tax.—One of the phases of inheritance taxation around which most interest has centered has been the movement towards reciprocity. By reciprocity is meant a mutual exemption of property to avoid double or multiple taxation. Before the 1929 legislation twenty-three states had passed some such legislation. The recent legislative sessions added fourteen more to the group, Arkansas, Idaho, Indiana, Iowa, Michigan, Missouri, New Mexico, North Carolina, South Carolina, Texas, Washington, West Virginia, Wisconsin, and Wyoming. New York and California extended their reciprocity agreements to include foreign countries. The influence of the Federal estate tax is still seen in the legislation of some states. Under the Federal law credit is given for taxes paid to the state up to eighty per cent of the Federal levy. Many states have revised their inheritance taxes to take advantage of this. Recent legislation in Iowa, Maryland, Michigan, Nebraska, and Rhode Island showed the influence of the Federal law. Florida is seeking to reamend her constitution to allow a tax sufficient to meet the Federal credit. Colorado and Pennsylvania now exempt the proceeds of insurance policies from the inheritance tax while New Jersey exempts trust funds arising from insurance. Many states made changes in rates, some upward and some downward, the most important being in California, Indiana, Idaho, North Carolina, Washington and West Virginia. Some states showed a tendency to raise exemptions. Thus California increased the exemption to widows from $24,000 to $50,000; Delaware from $3,000 to $20,000; and Indiana from $15,000 to $25,000.

Property and Business Tax.—Most legislation affecting property taxes was towards lessening the levy upon intangibles and the substitution of some form of business tax. Thus in California a two mill tax on intangibles was adopted. Oregon and Tennessee both place a tax of five per cent upon the income from intangibles. Maryland has fixed a minimum in the rate of levy. Pennsylvania now exempts property held in trust in the state. The change in method of taxing property was found in some. In the taxation of business more attention is turned to income, partly because states wish to tax banks on their income as permitted by revised statute 5219. This tax, however, cannot be at a higher rate than the tax upon other capital, which requirement has had an influence in standardizing the method of taxing business together with the levy upon it. California, Washington, and Oregon passed legislation by which banks are now taxed through an excise tax measured by their net income. In California the rate is 4 per cent with an offset of 10 per cent of the tax paid on real property. Oregon levies a 5 per cent tax and allows no offset while in Washington the rate is 5 per cent with an offset to the amount of tax paid on tangible personal property.

Commodity Tax.—Some form of commodities seems to gain favor more and more as a source of state revenue. Of the commodities taxed, gasoline is the most popular. The legislation of 1929 left no state without such a tax, both New York and Illinois, the two states without a gasoline tax, having passed such legislation. In the 1929 legislatures, twenty-one of them increased the rate of tax on gasoline. The result is the following levies now in force in the respective states:

RATE OF GASOLINE TAX, 1929

State	*Cents*	*State*	*Cents*	*State*	*Cents*
Alabama	4	Maine	4	Ohio	4
Arizona	4	Maryland	4	Oklahoma	3
Arkansas	5	Massachusetts	2	Oregon	3
California	3	Michigan	3	Pennsylvania	3
Colorado	4	Minnesota	3	Rhode Island	2
Connecticut	2	Mississippi	5	South Carolina	6
Delaware	3	Missouri	2	Tennessee	5
Florida	5	Montana	5	Texas	3
Georgia	4	Nebraska	4	Utah	3½
Idaho	4	Nevada	4	Vermont	4
Illinois	3	New Hampshire	4	Virginia	5
Indiana	4	New Jersey	2	Washington	2
Iowa	3	New Mexico	5	West Virginia	4
Kansas	3	New York	2	Wisconsin	3
Kentucky	5	North Carolina	5	Wyoming	4
Louisiana	4	North Dakota	2		

Practically the entire receipts from gasoline taxes are used for highway construction and maintenance, although there is now more disposition to distribute a part of the funds to minor political units. In Idaho, Michigan, and Pennsylvania, a part of the receipts is allocated to the development of air transportation. In Florida, Georgia and Texas, a small part goes for education and in South Dakota a part goes into the general fund. Some evidence of difficulty in collection is also seen in the 1929 legislation, for in several states laws were passed seeking to eliminate collection difficulties.

Gasoline is not the only commodity which has been made a base for state taxes. For some years different forms of tobacco have been taxed in some states. This is gradually being extended. In addition to this, many states are beginning to tax such articles as malt, soft drinks and carbonic gas.

ADMINISTRATION AND INVESTIGATION LEGISLATION

In the recent legislative sessions several states made some change in fiscal administration. Iowa provided for a board of assessment and review composed of three members at a salary of $4500. Kansas segregated its tax department from the Public Service Commission, while in Nebraska the department of State Tax Commissioner was formed. In Pennsylvania, a new Department of Revenue now administers taxes. Instead of one tax commissioner in Oregon there is a new State Tax Commission of three members with salaries not to exceed $4800. Salaries of Commissioners were increased in Missouri and Vermont and a Board of Tax Survey was formed in Arizona.

In recent years many states have provided for special studies in the field of public revenues and expenditures and recent legislation indicates that this is to continue. Within the past year special reports were made in Massachusetts, New York, North Carolina, Oregon, Arkansas, California, Illinois, Iowa, Colorado, and perhaps other states. Recent legislatures, however, appropriated something like $260,000 for special studies into fiscal problems. Some of the states making such provision were California, New Jersey, Idaho, Illinois, Indiana, Iowa, Massachusetts, Michigan, Missouri, North Carolina, Utah, Vermont, Washington and Wisconsin.

MISCELLANEOUS LEGISLATION

No form of state taxation is in a greater state of flux than the tax on commercial motor carriers. Several states changed the method of taxation in 1929 but as yet the methods used must be called experimental. Pennsylvania provides for a gradual reduction of the tax on anthracite coal. The poll tax has been increased in Vermont, the receipts to be used to apply to the flood bonds. In Oregon, Idaho, and Connecticut changes were made the amounts of forestry taxation.

STATE BUDGETS AND ADMINISTRATION

Budgets and administration have received much less attention than taxes, although some reports give some attention to them. There has been no retraction in the use of the budget and the administration of funds is undoubtedly becoming more businesslike and economical. Evidence of this is seen in the extension of centralized management, centralized purchasing, and an annual "outside" audit.

CITY FINANCE

By Merlin H. Hunter

Professor, University of Illinois

MUNICIPAL EXPENDITURES

Size and Type.—Statistics for 1927 of the finances of cities of more than 30,000 population are available in *Financial Statistics of Cities*, a publication of the Bureau of the Census. According to this report, the total cost of government in 1927 of the 250 cities in this class amounted to about $3,324,386,000. The table, page 176 indicates the total spent for different functions, together with the per capita expenditure and percentage distribution among the items.

Analysis of Expenses.—The items in this table are those included under the classification of "expenses" as used by the Census Bureau and do not include the sums spent for interest nor for outlays. Major emphasis, it will be noted, is placed upon education, followed by protection to person and property, health and sanitation, highways, and general

EXPENSES FOR OPERATION AND MAINTENANCE OF GENERAL DEPARTMENTS: 1927

	Total (000 omitted)	Per capita	Per cent distribution
All general departments	$1,750,707	$40.98	100.0
General government	$ 148,061	$ 3.47	8.5
Protection to person and property	350,341	8.20	20.0
Health and sanitation	176,996	4.15	10.1
Highways	157,198	3.68	3.9
Charities, hospitals, and corrections	106,492	2.49	6.1
Education	668,263	15.65	38.2
Recreation	60,364	1.41	3.4
Miscellaneous	82,992	1.94	4.7

government. The expenditures of municipalities for education are so familiar to everyone as to need no explanation. The principal items under protection to person and property are, of course, the maintenance of the police departments and fire departments. In addition, however, many other types of protective services are rendered. Some of these are the provision of militia and armories; the registry of deeds and mortgages; the inspection of buildings, plumbing, weights and measures, electric wiring and boilers; and the provision for licensing certain occupations, for humane societies, for employment agencies, and for rate investigations and regulations.

Extra Departmental Items.—Many items enter into municipal expenditures for general government. Aside from the expenses ordinarily found in operating a government, additional expenditures are found in engineering departments, civil service, public works, city planning and in different types of municipal courts. The concentration of population in cities requires that special emphasis be placed upon health and sanitation. Expenditures listed under those for conservation of health are for the department of health, for keeping vital statistics, for the prevention and treatment of communicable diseases, for the conservation of child life, and for regulation and inspection of food. Expenditures for sanitation are listed as those for sewers and sewage disposal, street cleaning, collection and disposal of refuse, and public convenience stations. Aside from the maintenance of highways, other items in this group of expenditure are for dust prevention, removal of snow and ice, and street lighting. In some cities, nearly every type of institution for charity, hospital service, or correction may be found, but, in general, cities seem to be content to let the states assume most of the responsibility for taking care of defectives, delinquents and dependents.

Growth in Expenditures.—In growth of expenditures, municipalities have shown no exception to other political bodies. The rapid rise in the price level has had its effect, especially in recent years. The increase in population, the demand for more public services, and the emphasis upon better and more efficient services, even though the price level might have remained stationary, have been reflected in continually increasing municipal expenditures. The following table shows the increase in expenditures for those cities of more than 30,000 population in 1905.

NET GOVERNMENTAL-COST PAYMENTS OF CITIES

For operation and maintenance		For interest		For outlays
Amount (000 omitted)	Per capita	Amount (000 omitted)	Per capita	(000 omitted)
$1,703,024	$46.25	$234,942	$6.38	$949,106
1,600,787	44.27	218,100	6.03	832,740
1,410,579	40.42	181,438	5.20	712,679
1,248,986	37.14	194,584	5.79	540,752
756,747	24.18	121,731	3.89	235,122
633,622	20.92	110,909	3.66	262,759
586,791	20.34	103,387	3.58	305,883
327,050	14.88	51,898	2.36	182,825

MUNICIPAL REVENUE

Amount and Sources.—In 1927, according to the report of the Census Bureau, the total revenue receipts of cities of more than 30,000 population were about $2,945,512,000 more than the total payments of the year, exclusive of those for permanent improvements, but $378,875,000 less than the total payments, including those for permanent improvements. In only seventy of the 250 cities was there sufficient revenue to meet all the payments during the year. The excess of these payments, of course, were met from borrowing. The two following tables indicate the relative importance of the different sources of revenue of cities for 1927 and the increase in net revenue receipts over a period of years—from the year, 1905 to the year, 1927.

REVENUE RECEIPTS: 1927

	Total (000 omitted)	Per capita	Per cent distribution
All revenues	$2,945,512	$68.96	100.0
General property taxes	$1,888,704	$44.21	64.1
Special property and other special taxes	64,458	1.51	2.2
Poll taxes	5,238	0.12	0.2
Licenses	88,941	2.08	3.0
Special assessments	233,293	5.46	7.9
Fines, forfeits, and escheats	18,733	0.44	0.6
Subventions, donations, and pension assessments	144,292	3.38	4.9
Interest, rents, and highway privileges	136,455	3.19	4.6
Earnings of general departments	74,456	1.74	2.5
Earnings of public service enterprises	290,942	6.81	9.9

NET REVENUE RECEIPTS

Year	Amount (000 omitted)	Per capita
1927	$2,568,749	$69.77
1926	2,391,607	66.14
1924	2,038,512	58.41
1922	1,801,302	53.57
1919	1,103,666	35.26
1917	968,445	31.97
1915	865,271	30.00
1905	498,837	22.79

Municipal Taxes.—The general property tax continues to be the principal source of municipal revenues. Under this head is included all the levies upon real and personal property. Special taxes include a wide range of levies, as those upon corporate franchises, insurance companies, and registry of mortgages. Poll taxes, either uniform or graded according to different bases, are still found in many cities, although their importance is much less than formerly. Under license taxes are found many types of levies. Many are for the grant of some form of permit, such as for engaging in particular forms of business. Special assessments are levied on the basis of individual benefits received from particular public improvements, such as street paving or sewer construction. The principal grant comes from the state treasury for the educational fund, although occasional gifts come from individuals. Most highway privileges are granted to some form of public utility under franchise agreements. Of the public services, the ownership of water plants are the most important. Toll bridges and ferries are also important in some cities.

INDEBTEDNESS OF CITIES

Gross Debt.—The indebtedness of many cities has increased to a point which may be viewed with alarm. The gross debt of the cities of more than 30,000 population for the year 1927 was about $7,847,657,300, or a per capita of $183.72. This consisted of $7,049,095,640 funded debt; $486,988,500 special assessment bonds; $233,208,000 revenue loans, and $78,465,000 outstanding warrants. Of the total gross debt, $625,084,000 by school districts practically coextensive with the city corporation, and $435,655,000 by other governmental units. The net indebtedness, that is the gross indebtedness less sinking fund assets, was $5,479,285,000 or $128.27 per capital.

Net Debt.—That there has been a marked increase in the net indebtedness of municipalities is indicated by the following table. The figures are for the cities with a population of more than 30,000 in 1905.

TOTAL AND PER CAPITA NET INDEBTEDNESS OF CITIES

Year	Total (000 omitted)	Per capita
1927	$4,943,508	$134.27
1926	4,632,803	128.13
1924	3,841,980	110.09
1922	3,280,646	97.57
1919	$2,541,172	$81.18
1917	2,445,852	80.75
1915	2,245,906	77.86
1905	1,119,346	50.94

Current Revenue Plan.—The growing burden of municipal indebtedness has led many to inquire if some more economical plan might not be found to provide for capital improvements. Some progress has been made and some cities have gone so far as to map out the improvements to be made for ten or more years in the future, with the entire cost to be met from current revenue. In adopting such a plan, the justification has been economy to the taxpaying public. A more extended adoption of the plan will help to lessen the extent of municipal borrowing.

MUNICIPAL RESEARCH BUREAUS

The increasing burden of municipal expenditures has not been accepted without protest nor viewed without alarm. In fact, many organizations have come into existence primarily for research into the problems of municipal government in an attempt to secure greater efficiency and economy. Such bureaus of research are found in Detroit, Des Moines, Baltimore, Kansas City, Philadelphia, San Francisco, Schenectady, Toledo, Milwaukee, Boston, and many other cities. The activities of the bureaus vary somewhat in details, but in general they are somewhat the same as the Detroit bureau which describes itself as follows: "The Detroit Bureau of Governmental Research is organized to increase the effectiveness of local government through coöperation with officials and by keeping citizens informed about the City's business. The Bureau is absolutely non-partisan, and takes no part in the election or appointment of persons to office. The cost of the Bureau is financed and controlled by the Detroit Community Fund, but only such contributions are used as are specifically designated to the Bureau by the donors."

TAX LEGISLATION

By Beulah Bailey

Librarian, New York State Department of Taxation and Finance

SPECIAL COMMISSIONS

During 1929, 43 state were in regular session. Radical changes were made in the tax laws and the $260,000 appropriated in several of the states for special tax study, predicts further changes in the near future. California, Illinois, Massachusetts, Michigan, Utah, Vermont, and Washington are interested in the tax problem in general; Idaho in assessments; Iowa, the elimination of the direct property tax; Maine, the sales tax; Minnesota, the bank tax; Missouri, the cost of administration especially of state institutions; New Jersey, county and municipal taxes; North Carolina, the financing of education; and Kansas the codification of the tax law. The states which made special reports during 1929 were Arkansas, California, Illinois, Massachusetts, New York, North Carolina and Oregon. Special tax studies of Iowa and Colorado were made under the auspices of the United States Department of Agriculture.

ADMINISTRATION

Iowa created a Board of Assessment and Review with three members, the term of office being six years and the salary $4500. In Kansas the tax department has been segregated from the Public Service Commission, and a commission of three members has been appointed. Nebraska has a State Tax Commission for the first time. A department of revenue in Pennsylvania has taken over the administration of the taxes. Formerly in Oregon, there was but one Tax Commissioner, now there is a Commission consisting of three members; the term of office is four years and the salaries are not to exceed $4800 each. Salaries of the Commissioners have been increased in Missouri, Vermont, and Arizona, in the latter state by making the Commissioners members of the Board of Tax Survey at an additional salary of $1500 each.

FINANCIAL AND INDUSTRIAL TAXES

California, Oregon and Washington this year levied an excise tax on banks according to or measured by net income. In California the rate is 4% with an offset up to the amount of 10% of the banks real property tax, but not exceeding 75% of the total tax levied. A similar tax is levied on business corporations with a minimum tax of $25. In Oregon the rate is 5% with no offset. Oregon also has the tax on business corporations. In Washington, it is 5% but with an offset of the amount of taxes paid upon tangible personal property. It seems that the decision of the United States Supreme Court in Macallum Company *vs.* the Commonwealth of Massachusetts (No. 578) has held all these taxes unconstitutional. Hand in hand with the bank tax in California and Oregon go the taxes on intangibles. In California it is 2 mills on intangibles and 1 mill on solvent credits. In Oregon, it is 5% upon all income derived from money and credits other than stock dividends. Tennessee also levied a tax of 5% upon the income from intangibles. There is a constitutional amendment permitting classification, pending in both North Carolina and Washington.

INCOME AND INHERITANCE TAXES

Arkansas and Georgia have levied an income tax. In Arkansas the rate graduates from 1% to 5% on amounts ranging from $3000 to $25,000. The exemptions are the same as the Federal, $1500 for single, and $3500 for heads of families. There is also a 2% tax on incomes of domestic and foreign corporations. The rates in Georgia are ⅓ of the Federal rates. Georgia does not permit classification but there is a constitutional amendment pending permitting a personal income tax not to exceed 5%. Georgia also passed a gross income tax on business. The rates range from ½ mill to 3 mills depending upon the kind of business. The exemption is $30,000. In 1930 there will be another referendum in Oregon on the income tax. This is the fourth attempt. Kansas will in the same year vote upon a constitutional amendment permitting an income tax.

Fourteen states this year passed reciprocal provisions in regard to the taxing of the intangible personalty of non-resident decedents. They were Arkansas, Idaho, Indiana, Iowa, Michigan, Missouri, New Mexico, North Carolina, South Carolina, Texas, Washington, West Virginia, Wisconsin and Wyoming. This makes thirty-six states in all that have reciprocity either in whole or in part. Iowa, Maryland, Michigan and Nebraska this year picked up the 80% Federal credit. The constitutionality of Pennsylvania's law was upheld by the Supreme Court. There is a constitutional amendment pending permitting an inheritance tax in Florida the rate of which shall be 80% of the Federal.

Extensive changes were made in the inheritance tax rates in California, Indiana, Washington, North Carolina, Idaho and West Virginia. In California and Washington the rates were decreased; in North Carolina, Indiana, and Idaho, increased. In West Virginia it was a change from certain times the primary rates in the upper brackets to a definite rate. Connecticut, Maryland and Rhode Island entirely revamped their inheritance tax laws.

GASOLINE TAX

This year twenty-one states increased their gasoline tax rate, New York levied a tax for the first time, a 2¢ tax based on motor fuel; Massachusett's tax passed in 1928 became effective January 1, 1929, and Illinois' second attempt went into effect August 1, 1929, a 3¢ tax. To-day there are seven states with a 2¢ tax, last year there were twelve; nine states with a 3¢ tax, last year fifteen; twenty states with a 4¢ tax, last year eleven; eight states with a 5¢ tax, last year only six; and three states with a 6¢ tax, last year none. One state has a rate of 3½¢. Missouri by constitutional amendment has established a 2¢ rate for a period of 10 years. In the majority of the states the additional revenue is to go to the localities to relieve real property. In Colorado, the ½ mill road tax on general property is repealed. In North Carolina, the state has taken over the maintenance of all the principal county roads besides giving the additional revenue to the localities. In New York, the ½ mill state tax was not levied this year, and the state has relieved the county of the $50 per mile road maintenance and assumed the county's former 35% of the original cost of road construction.

Formerly only Georgia, Louisiana and North Carolina required the distributors of gasoline to be bonded, now Colorado, Indiana, Mississippi, Ohio, Pennsylvania, South Carolina, Tennessee and Texas require bonds. Yearly more and more of the states are allowing a certain percentage of the amount collected, or of gallonage to cover cost of collection by distributor, or leakage. New York allows 1% of the amount collected; Pennsylvania, 1% of the first $2,000 and ½ of 1% on all over that amount; Illinois and Montana 2%. Indiana this year allowed a 3% tare and Colorado a 2% tare. There were no 1929 amendments diverting the gasoline money to other channels than highways except in Idaho, Michigan and Pennsylvania where a certain amount is to go to aeronautics. At present only five states with the exception of these use the gasoline revenue for anything but highways. Florida, Georgia and Texas use part for education; South Dakota gives some to the general fund and New Jersey appropriates $90,000 a year to inland water ways. During 1928, $304,871,766 was collected from the gasoline tax.

FORESTRY TAXES

Oregon changes its forestry tax to a $5 flat rate per acre and a yield tax of 12½%. Formerly all forest land was taxed as general property except classified land which was assessed at $1 per acre. Idaho has repealed their former forestry law exempting a forest tract for a period of 10 years. Lands in the new reforestation districts are assessed at $1 per acre. When the timber is cut there is a yield tax of 12½% of the market value. Connecticut has already had three different methods of encouraging reforestation and now they have a fourth. Trees on classified land are not to be assessed. The land itself can be revalued only when the town has a general revaluation. The land is subject to the ordinary annual tax rate. Since a town revalues its property only once every ten years, the valuation of the classified land having tree growth will be subject to taxation at the local rate upon a fixed valuation for ten years.

MISCELLANEOUS TAXES

This year there is a new excise tax on malt extracts. Arkansas, Michigan, South Dakota and Tennessee are the optimistic states. In Arkansas and South Dakota the tax is 10% of the selling price; in Michigan and Tennessee it is 5¢ per lb. Tennessee and Arkansas have also levied a tax on soft drinks. Michigan has invoked the referendum on a proposed tobacco tax. Michigan this year levied a severance tax on oil and gas. The rate is 2% of the gross cash market value. Pennsylvania granted a gradual reduction of the *ad valorem* tax on anthracite coal with its final elimination May 31, 1931. Vermont increased the poll tax from $1 per poll to $2.50. The increased revenue is to be applied directly to the principal and interest of the Vermont Flood Bonds.

LAND AND PROPERTY TAXES

By Jens P. Jensen

Professor, University of Kansas

GENERAL PROPERTY TAXES

All but a few of the state legislatures were in session and the output of tax legislation was large; yet few measures of major proportion were enacted. The tax rates have continued to increase. Maine adopted a tax of one mill on the dollar for the state university. New York did not levy a property tax for state purposes, though last year that tax produced a revenue of $13,500,000. Pennsylvania repealed the tax on traction engines, the last tax on personal property to go. Up to the present time fifteen states have abandoned the personal property tax on motor vehicles, which does not necessarily mean a lighter tax burden but often merely heavier taxes in the form of license taxes and motor fuels taxes.

SPECIAL TAX COMMISSIONS

Investigations.—There have been in several states special tax commissions appointed to investigate the respective state tax systems and to recommend changes therein. The commissions are not solely concerned with property taxation but the pressure of heavy property taxes has been the major stimulus to their appointment and in several states, as for example in Kansas and Iowa, the commissions have been specifically directed to find and recommend other sources of revenue so that the state tax on property might be eliminated. Segregation of sources of revenue for state and local purposes is thought desirable in most of the states. However, in California the scheme of segregation which has been in effect since 1911 was criticized and has been partly abandoned.

Composition and Reports of Commissions.—In the following states one or more special tax commissions has recently reported and is preparing a report: Arkansas, California, Idaho, Illinois, Iowa, Indiana, Kansas, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, North Carolina, Utah, Vermont, Washington and Wisconsin. The composition of these commissions varies widely. In Indiana the investigation assumes the form of a conference of citizens. Elsewhere, with or without salary, the commissioners are appointed in number varying from three to nine. In Idaho the State Board of Equalization is to conduct the study and is given a special appropriation. In Minnesota the Commission on Bank Taxation is continued. The New York Commission on Retrenchment and Economy is discontinued, having served for several years. In some of the states such as North Carolina, Iowa, New York, Pennsylvania and other states, the reports of the commissions have already been made and the legislative program taken up by the legislature.

CENTRAL ADMINISTRATIVE CHANGES

Arizona.—A Board of Tax Survey with a salary for each member of $1500 is provided for. The Tax Commission also constitutes the Board. A scientific survey is to be made of all taxable property and an appropriation for salaries and expenses of $30,000 is provided.

Iowa.—The State Board of Assessments and Review is created, consisting of three members appointed by the Governor and approved by the Senate, with terms of six years and salaries of $4500. The State Board assumes the duties formerly carried on by the State Executive Board, which was limited largely to the equalization of local assessments and assessment of certain public utility property. The new Board is assigned the duties ordinarily given to a Tax Commission. The state thus loses a position it has long held as the only state in that section of the country not having a permament administrative Tax Commission.

Kansas.—The Public Service Commission was unscrambled and a separate Tax Commission of three members created, similar to that existing prior to 1925.

Missouri.—Salaries of the members of the Tax Commission were increased from $4,000 to $5,000 for the chairman and from $3,500 to $4,500 for the other two members.

Nebraska.—The Nebraska state government was reorganized and a Tax Commissioner assumed the duties formerly belonging to the Secretary of Finance.

North Carolina.—The Commissioner of Revenue in North Carolina who heads the state tax system and acts as the chairman of the State Board of Assessments is made appointive by the governor instead of being elected. The Board of Assessments has been increased to five members. A permanent tax commission to study continuously the tax system and recommend changes is provided.

Oregon.—A Tax Commission of three members was created, consisting of three members appointed for four years at salaries not exceeding $4800. Each of the three commissioners is put in charge of a separate department, namely, the taxation of utilities, the valuation and assessments, and receiving and auditing.

Pennsylvania.—The fiscal code, which is one of ten separate codes adopted, regulates the collection and disbursement of state revenue and outlines the duties of the new Department of Revenue, the Treasury Department and the Board of Finance and Revenue. Many of these duties were formerly performed by the Auditor General. Taxes are collected by the Department of Revenue and paid to the State Treasurer. The Auditor General is now Auditor only, with minor exceptions, and the State Treasurer is custodian of the state funds.

Vermont.—The powers of the Tax Commissioner were expanded and his salary increased from $3,000 to $4,000. Certain minor changes in administration were also made.

Wisconsin.—A state budget department in charge of a director was created in place of the former commission budget. This is separate from the Tax Commission which remains unchanged.

LOCAL ADMINISTRATION

Idaho.—The fiscal year begins July 1, whereas it was formerly the calendar year. Colorado made a similar change. In North Carolina the tax day is made January 1 for both personal and real property. In Illinois the tax limits are to be indicated on the ballot in case of votes for special projects. The Sanitary District is limited in respect to the bonds it may issue. If the amount is more than $27,000,000 the question must be submitted to the voters. In Massachusetts, in case the assessor refuses abatements, the taxpayers may appeal to the Supreme Court without paying the tax, which was formerly a condition precedent to obtaining relief. In Pennsylvania improvement bonds are valid debts of the municipal governments and do no longer rest on the benefits of special members except where the bonds exceed the constitutional borrowing power of the cities. Provision is made in Rhode Island for voluntary municipal audits through petitions to the Commissioner of Finance. In Washington every fourth class city must annually prepare an itemized budget of expenses for money to be raised by taxes for the year. In North Dakota the law authorizing the county commissioner to levy a tax for encouragement of immigration is repealed.

Arkansas.—Following the recommendations of the special Tax Commission, a new local tax machinery is set up. The township assessor is abolished and a county assessor provided. County boards of equalization are selected by the county court. The counties are classified and a schedule of salaries for the assessors, ranging from $1,500 to $5,000, and for their deputies is established. The state pays one half of the salaries and the expenses. The Tax Commission created in 1927 is the central administrative agency. In Illinois the State Tax Commission adopted "Rule Fifteenth" for Cook County (counties having population of 500,000 or over), providing elaborate procedure for assessment and review, designed to remedy the chaotic tax situation in Chicago. West Virginia county boards of review must give five days' notice in writing when an assessment is increased; and appeal may be taken to the Supreme Court when the property is worth $50,000 or more. In North Carolina a horizontal change in valuation can be made only upon inspection of each parcel of property. North Dakota set up a comprehensive structure of tax limitation for all units of government; and the school districts are added to the political units that must prepare a budget in order to make a tax levy legal.

TAXATION OF INTANGIBLES

Classification.—The most noteworthy in the low-rate taxation of intangibles is the passing of the constitutional amendment in Ohio permitting classification of intangibles only. Many times in the past similar amendments have been defeated. Almost at once a temporary injunction against putting the new tax into effect was issued. In California the 1928 constitutional amendment authorized a tax at not to exceed four mills on intangibles, giving the legislature power, by a two-thirds majority, to alter the rate. In acting under this authority the legislature in 1929 fixed the rate on certain stocks and bonds at two mills and on solvent credits at one mill on the dollar. The proceeds are distributed equally to the city, the county, and the school districts. The penalty for non-listing is four times the tax. Back assessments are limited to three years. In Montana, moneyed capital competing with the business of national banks, including credits of insurance companies in excess of their legal reserve, is put in Class 4, and assessed at thirty per cent of its value; while moneyed capital not so competing continues assessable at seven per cent.

Rates.—The new Oregon law makes intangibles subject to an income tax of five per cent, with an exemption of $200. A similar tax of five per cent is placed on the income from taxable bonds and stocks not otherwise required to be taxed on an ad valorem basis, with an exemption of $1,000. The law has been tested and sustained (159 Tenn. 349). These two income taxes are of the so-called "schedular" or "origin" variety. The large exemptions appear hardly to be warranted. In Maryland the tax rate on intangibles was limited to three mills for county and city purposes and to the regular state rate but not exceeding one and a half mills for state purposes.

Court Decisions.—For the second time in twenty-five years North Carolina has rejected the classification amendment for the low-rate taxation of intangibles. The legislature promptly passed another resolution for classification, to be voted upon, which would permit the classification of all property. The gain in the number of states permitting the classified property tax by the accession of Ohio, as stated above, is offset by the decision of the Kansas Supreme Court in holding the intangible tax of that state unconstitutional. The effectiveness of the Kansas intangibles tax had already been restricted by two decisions. In one case (272 Pac. 135) building and loan associations without capital stock were allowed to deduct from their intangible assets: (1) the cash value of withdrawable shares, which is taxable to the shareholders, and (2) the sum of their intangibles on which has been paid the low-rate intangible taxes or the recording tax, leaving little or none taxable to the association. In as much as very little of the withdrawable shares is actually taxed to the holders, the return of the tax is greatly reduced. In another case (278 Pac. 39) domestic life insurance companies were allowed to deduct from their capital stock their reserves plus such intangibles as had paid the mill tax or the recording tax, again seriously reducing the tax base.

PROPERTY TAX EXEMPTIONS

Increase.—The pressure for increased exemptions continues. In Maine the exemption of household furniture was raised from $200 to $500. New York exempted the property of agricultural associations. North Dakota clarified the exemption of farm structures and improvements located on agricultural land.

Construing Exemption Laws.—In the courts exemption laws are usually though not always strictly construed. A Wisconsin woman's club is not such an educational institution as to enjoy exemption by reason of appropriating $500 annually to assist in training child welfare workers (221 N. W. 375). An irrigation district is not exempt, not being within the classification of public corporations specifically mentioned (279 Pac. 369). A Missouri Y. M. C. A. building in which cafeteria, shops and rooms were charged for, is not exempt (11 S. W. [2nd] 30), not being devoted exclusively to religious worship or charity. School property of a religious order, in which girls attending paid tuition and other fees in excess of $1,000, is not devoted to religious or charitable purposes such as to be exempt, although the individual members of the order have taken the vow of poverty (142 Atl. 678). A hospital in Arkansas maintained by a railroad exclusively for contributing employees is taxable (23 Fed. [2nd] 283). Failure of a church to make affidavit of exemption as required is not equivalent to a waiver of exemption rights (267 Pac. 703). Material on hand in Kentucky for manufacture owned by the Illinois Central Railroad is exempt, though not purchased in Kentucky, though not to be manufactured for sale, and though manufacture is not the principal occupation of the owner (14 S. W. [2nd] 172). In Nebraska the County Board of Equalization may add, without notice to owner, property omitted by the assessor, which he believes erroneously to be exempt (223 N. W. 667).

Exemption privileges necessitate careful assessment. A town having contracted with a new mill for exemption cannot ignore such agreement when the mill had established its plant in reliance upon the exemption (146 N. E. 511). Unit assessment of land, a part of which was exempt, will void the entire assessment so long as the exempt and taxable lands were blended in the assessment (138 Atl. 620). Property held by a city on assessment day retains its exemption, though sold to a private person, during one year following (120 So. 286). Purchase of liberty bonds obviously made just prior to the assessment day and immediately thereafter sold for the purpose of tax avoidance is not an exchange of taxable for non-taxable property; such sale is a misdemeanor and does not avoid taxation (146 S. E. 861).

TAX PAYMENTS AND ASSESSMENT

Situs.—Taxes on personal property are payable where the owner resides actually rather than where he maintains a nominal domicile and votes (11 S. W. [2nd] 455). Taxes paid on property later found to be located outside of the taxing city are voluntarily paid and hence not recoverable (149 S. E. 223). Bank deposits and other intangibles in Michigan belonging to a Maryland corporation are not taxable in Michigan, that state adhering to the common law definition of situs (217 N. W. 777). Assessment of the Minnesota gross earnings tax on a mileage basis, without allocation of earnings represented by docks located in Superior, Wisconsin, is not importing value for taxation (Great Northern Railroad Co. *vs.* Minnesota, U. S. Sup. Ct. Feb. 18, 1929).

Land and Buildings.—Assessment of a quarter section of land to one person when in fact a part thereof belonged to another voids the assessment (272 Pac. 313). Payment of taxes on a disputed valuation, afterwards reduced so that the payment was excessive is voluntary and excess is recoverable (142 Atl. 578). Description of property in tax notice as definite as that under which the property is conveyed by sale is adequate to sustain the tax (163 N. E. 825). A special assessment levied upon a railroad for an improvement conferring no benefit upon the railroad is void (115 So. 669). In New Jersey an assessment was set aside because excavations were assessed as "improvements," the statute defining "improvements" as structures (141 Atl. 23).

Oil leases are not assessable as of July 1 when on the preceding tax day, January 1, the oil was not discovered, and the mineral rights not severed (3 S. W. [2nd] 559).

Property in Storage.—In Texas a law requiring a public warehouseman to furnish the assessor a list of taxable property in storage is not unreasonably discriminatory though it does not require banks and trust companies to furnish similar lists (3 S. W. [2nd] 947).

Business Property.—In assessing business property a valuation arrived at by capitalizing rentals is inadequate (5 S. W. [2nd] 756. But assessment of securities at a low rate by capitalizing dividends at six per cent is not arbitrary or capricious (143 Atl. 677). Assessment of capital stock of a corporation in Illinois at 60% of full value is not invalid when property in general is assessed at the same ratio (160 N. E. 755). Cars held on tax day, January 1, but sold a few days later, before assessed, are nevertheless taxable to the owner as of January 1 (120 So. 23).

Re-assessment. — A re-assessment may be made any time and need not cover the entire state (166 N. E. 21). The Wisconsin Tax Commission was ordered to re-assess the property of a public utility rather than to "scale down" an excessive assessment to such percentage of true value as represented the assessment of other property in districts where the public utility property is located (218 N. W. 731).

Collection.—A tax sale of property in excess of the amount necessary to cover taxes due is illegal when a sale of separate divisible parts would suffice (147 S. E. 32). A new Michigan law makes a special assessment a personal obligation of the owner, not a lien upon real property affected. But in North Dakota personal property taxes are made a lien upon real property owned. In New York the time for commencing suit to collect personal property taxes is extended from one to three years.

Taxation of Municipal Property.—Rhode Island offers an interesting attempt to solve the problem of the taxation of municipal property located outside of the corporate boundaries. The general assembly authorized the City of Providence to negotiate with the village of Scituate and fix by agreement the value at which the water supply plant of the former, located within the latter, shall be taxed for 1929 to 1933, inclusive.

INCOME TAXES

By Mabel Newcomer

Professor, Vassar College

FEDERAL

Rates and Credits.—The income tax provisions of the Revenue Act of 1928 remained in force during the year 1929. Normal rates are 1.5 per cent on the first $4000 of taxable income, 3 per cent on the next $4000, and 5 per cent on all over $8000. The surtax rates begin with 1 per cent on net income in excess of $10,000 and reach a maximum of 20 per cent on net income in excess of $100,000. A credit of 25 per cent of the normal tax is allowed on all net income under $5000 and on "earned" net income under $30,000. Personal exemptions are $1500 for single persons, $3500 for heads of families, and $400 for dependents. The exemption for estates and trusts is $1500. The corporation income tax rate is 12 per cent and the specific credit granted to domestic corporations with a net income of $25,000 or less amounts to $3000.

Tax Revenue.—The reduction of corporation income tax rates, first effective for 1928 income, decreased the yield of the 1929 corporation income tax below that of the preceding year. This decrease has been more than offset, however, by increased collections from the personal income tax. The net gain in all income tax collections exceeded $150,000,000 for the fiscal year ending June 30, 1929. For the first quarter of the fiscal year 1929-30, personal and corporation income tax collections combined exceed those of the same quarter of the year preceding by nearly $100,000,000.

In December Congress passed a measure reducing both the normal personal tax and the corporation tax by one per cent. This cuts the personal tax to one half of one per cent on the smaller incomes. The reduction applies only to the 1930 tax on 1929 incomes, and was passed largely to restore confidence in the insecure stock market.

REVENUE FROM FEDERAL INCOME TAX.

(in thousands of dollars)

Fiscal year	Corporation tax	Personal tax	Total tax	Per cent of all federal taxes from income tax
1928-29	$1,235,733	$1,095,541	$2,331,274	66.0
1927-28	1,291,846	882,727	2,174,573	64.6

STATE INCOME TAXES

Legislation.—The year 1929 has been outstanding in income tax legislation. After a period of five years in which no new state was added to the list of those imposing income taxes, the 1929 sessions of state legislatures produced four new personal income tax laws, and five new corporation income tax laws. Arkansas, Georgia and Oregon have adopted both personal and corporation income taxes; Tennessee a personal income tax on income from stocks and bonds; and California and Washington corporation income taxes.

State Tax Rates.—In both Arkansas and Oregon the rates of the new tax on personal income range from one to five per cent. The Oregon tax, however, reaches its maximum rate on taxable income in excess of $4,000, whereas the Arkansas tax reaches its maximum rate on taxable income in excess of $25,000. The Georgia rates are one-third of those imposed by the Federal income tax. The Arkansas tax was first levied in 1929 on 1928 income. The Georgia and Oregon taxes will be levied first in 1930 on 1929 income. The Oregon tax is, however, subject to referendum in November, 1930. The Tennessee tax is 5 per cent with the exemption of income from one thousand dollars worth of stocks or bonds. Under the Oregon law income from intangibles is separately taxed at a flat rate of 5 per cent with a $200 exemption.

Exemption and Residence Provisions.—New York has increased personal exemptions for single persons to $2500 and for heads of families to $4000. These exemptions were in effect for 1928 income. Massachusetts has amended its law to tax persons who have changed their residence during the year only on that income received for the time in which they were domiciled in the state. North Dakota has amended her law to include income of non-residents heretofore not taxable. Other amendments to existing personal income tax laws are of a minor nature.

Corporation income tax provisions are similar for California, Oregon and Washington. The rates, however, are 4 per cent in California, and 5 per cent in Oregon and Washington. The Washington tax applies only to banks and financial corporations, whereas the California and Oregon laws apply to general business corporations as well. All three of these laws provide for offsets for personal property taxes paid within the state. The Arkansas tax on corporation income is at a rate of 2 per cent with a $1500 exemption. The Georgia rate is one-third of that imposed by the Federal income tax law, *i.e.*, 4 per cent. Both of these apply to all corporations doing business in the state with the exception of insurance companies in Georgia. All of these new state corporation income taxes leave the allocation of income arising from interstate transactions to the discretion of administrative officials.

Court Decisions.—The most significant court decision of the year, from the point of view of state taxation of income, is undoubtedly the Macallen decision (The Macallen Co. *vs.* Massachusetts, U. S. Sup. Ct., May 27, 1929). According to this decision the designation of a tax as a privilege tax, when it is in effect a tax on income, does not justify the inclusion of the income from tax-exempt securities in the base of the tax. This is of especial importance in view of the fact that three of the new corporation income taxes—those of California, Oregon and Washington, as well as the older New York and Massachusetts taxes,—apply to banks and include the income from such tax-exempt securities in the tax base. Not to include such income would mean practical exemption from taxation in the case of many large banks with heavy investments in such securities. The Macallen decision applies to ordinary business corporations and does not pass judgment on the states' right to tax national banks by this method under section 5219, but this right will undoubtedly be challenged as a result of this decision.

Present Status of State Income Taxes.—Twelve states are taxing both personal and corporation income. Four states are taxing personal income only. And four states have taxes on corporation income only. All of these states excepting Delaware, Massachusetts, New Hampshire and Tennessee tax such income of non-residents as they can reach. New York, North Carolina and South Carolina, however, credit non-residents with the amount of any income tax paid in the state of residence if such state allows similar credits. All of these states but Wisconsin tax residents on income derived from sources outside of the state, with only Missouri and North Carolina allowing credits for income taxes paid in other states.

Proceeds of State Income Taxes.—In Arkansas $500,000 of the tax is credited to the charities fund and $750,000 to the common school equalization fund. The remainder is for general state use. In Delaware the greater part of the proceeds of the income tax are credited to the state school fund. In Massachusetts the state retains the temporary additional tax and enough of the regular tax to cover the cost of administration. The remainder is distributed to the local districts. In New Hampshire, also, the proceeds over the cost of administration are turned over to the towns and cities. In New York half of the personal income tax, and one-third of the corporation income tax and all of the bank income tax are distributed to the local districts. In Wisconsin the surtax is used for special state expenditures, but only 40 per cent of the normal tax is kept by the state. In the other states the proceeds are all kept for general state purposes.

REVENUE FROM STATE INCOME TAXES

(in thousands of dollars)

State	Amount from personal income	Amount from corporation income	Amount for state purposes	Amount for local purposes	Fiscal year ending
Conn.	—	$2,471	$2,471	—	June 30, 1929
Del.	$1,616	—	1,616	—	Oct. 31, 1928
Mass.	24,221	6,066	1,663	$27,145	Nov. 30, 1928
Miss.	675	979	1,654	—	Dec. 31, 1928
Mo.	2,406	1,364	3,698	—	Dec. 31, 1928
Mont.	—	249	249	—	June 30, 1928
N. H.	620	—	10	610	June 30, 1928
N. Y.	83,019	52,605	71,576	64,048	June 30, 1929
N. C.	2,354	5,842	8,196	—	June 30, 1928
N. D.	234	286	520	—	June 30, 1928
Okla.	1,089	—	1,089	—	June 30, 1928
S. C.	399	1,864	2,263	—	June 30, 1928
Va.	1,818	1,637	3,455	—	Feb. 28, 1929
Wis.	6,793	13,337	8,261	10,097	June 30, 1928

STATE PERSONAL INCOME TAX EXEMPTIONS AND RATES

State	Year first effective	Personal exemptions			Rates of tax (per cent)	Amount of taxable income in excess of which maximum rate applies
		Single person	Head of family	Dependents		
Ark.	1929	$1,500	$2,500	$400	1 -5	$ 25,000
Del.	1917	1,000	2,000	—	1 -3	10,000
Ga.	1930	1,500	3,500	400	(a)	100,000
Mass.	1917	2,000	2,500	250 (b)	1½-6 (c)	—
Miss.	1914	1,500	3,500	400	2½-5½	15,000
Mo.	1917	1,000	2,000	200	1	—
N. H.	1924	200	200	—	(d)	—
N. Y.	1919	2,500	4,000	400	1 -3	50,000
N. C.	1921	1,000	2,000	200	1¼-5	15,000
N. D.	1919	1,000	2,000	300	1 -6	10,000
Okla.	1913	3,000	4,000	200-500	¾-2	25,000
Ore.	1930	1,500	2,500	400	1 -5 (f)	4,000
S. C.	1922	1,500	2,500	400	1 -5	15,000
Tenn.	1929	(e)	(e)	—	5 (i)	—
Va.	1843	1,000	2,000	400	1½-3	5,000
Wis.	1911	(g)	(g)	(g)	1 -6 (h)	12,000

(a) One-third of Federal income tax rates. (b) Exemptions apply to earned income. There is a flat exemption on unearned income of $300. (c) One and one-half per cent on earned income and annuities; 3 per cent on capital gains; 6 per cent in interest and dividends. (d) Average rate on real estate. This is usually between two and three per cent. Applies only to income from dividends and interest. (e) Income from $1000 worth of bonds or stocks. (f) Exemptions and rates do not apply to income from intangibles. This is taxed at 5 per cent with a $200 exemption. (g) In place of exemption taxpayers must deduct from their tax after it has been computed, $8 for a single person, $17.50 for a head of family, and $3 for each dependent. (h) Including surtax for teachers' pensions rates are 1⅙ to 7 per cent. (i) Applies only to income from dividends and interest.

DIGEST OF STATE CORPORATION INCOME TAX PROVISIONS

State	Year when first effective	Kind of corporations Exempt	Amount of income exempt	Rate of tax (per cent)	Exemption of dividends of other corporations paying income tax to state	Exemption of interest from government bonds
Ark.	1929		$1500	2	—	x
Cal.	1929	Public utilities; insurance	—	4	x	—
Conn.	1915	Public utilities; insurance; banks	3000(a)	2	—	—
Ga.	1930	Insurance	3000(a)	4	—	x
Mass.	1919	Public utilities; insurance	—	2½ (b)	x	—
Miss.	1914	Banks	1500	2½-5½ (c)	x	x
Mo.	1917	Express; insurance; banks	—	1	—	x
Mont.	1917	Express; national banks	2500	1	—	—
N. Y.	1917	Public utilities; insurance; real estate	—	4½	—	—
N. C.	1921	Foreign insurance; national banks	—	4½	x	x
N. D.	1919	Insurance; national banks	—	3	x	x
Ore.	1930	Public utilities; insurance; real estate	—	5	—	—
S. C.	1922	Insurance; banks	—	4	x	x
Va.	1927	Public utilities; insurance; banks	—	3	x	x
Wash.	1929	All except banks and financial corporations	—	5	x	—
Wis.	1911	Public utilities; insurance	—	2-6 (d)	x	x

(a) Same as Federal. (b) Bank rate to be determined by Commissioner; not to exceed highest rate applied to business corporations. This was 5.34 per cent in 1928. (c) Same as personal; maximum on taxable income in excess of $5000. (d) Six per cent applies to all income in excess of $6000.

CORPORATION AND BANK TAXATION

By Jens P. Jensen

Professor, University of Kansas

STATUTORY CHANGES IN CORPORATION TAXES

New York.—There were numerous minor changes in the New York corporation tax law. Certain business corporations have been subject to a minimum tax of: (1) not less than $10, and (2) not less than one mill on the face value of issued capital stock, and (3) are now subject to a new alternative minimum not less than would be produced by applying a rate of two per cent to a base consisting of the entire net income plus salaries and other compensation paid to all elected or appointed officers, and to any stockholder owning in excess of five per cent of the issued capital stock of the corporation, excepting dividends, and after deducting from the base six thousand dollars and any deficit for the reported year (Ch. 385, 1929). The highest tax is obtained.

North Carolina.—The state tax on railroad corporations was increased from one-fifth to two-fifths of one per cent of the assessed valuation; electric light and power companies from one per cent to two per cent of the gross earnings and receipts; Pullman car companies from four per cent to eight per cent of gross earnings in the state; and express companies from $7.50 to $15.00 per mile of line in the state where the net income on investment is six per cent or less during the year. On other domestic companies the tax was changed from one tenth of one per cent of assessed value to one tenth of one per cent of the capital, surplus, and undivided profits, but in no case less than the value of the property including the corporate excess.

Oregon and California.—To adjust bank taxation to Section 5219 R. S. U. S., corporations in general are to pay franchise or excise taxes measured by net income. In the former the rate is five per cent and the minimum tax is $25 with a ninety per cent offset for personal property taxes. In California the rate is four per cent, the minimum tax $25, and the offset not exceeding seventy five per cent for property taxes but not in excess of ten per cent of real property taxes.

Wisconsin.—A similar purpose led Wisconsin to make all public utilities except steam railroads and sleeping car companies subject to the income tax.

Massachusetts.—Incorporated investment trusts are relieved from the corporate excise tax and the corporate income tax in lieu of taxes on the income of the securities the same as if the trusts had remained unincorporated voluntary associations, that is, subject to the personal income tax.

Rhode Island included toll bridges among the public service corporations subject to a one per cent gross earnings tax instead of the four mill tax on corporate excess. The state also substituted a tax of five per cent of marine insurance profits for a two per cent premium tax on the marine insurance, a form of tax that is in force in the District of Columbia and is sponsored by the Marine Underwriters Association of New York, and which will produce much less revenue.

North Dakota repealed her corporate excess law, which had been held in violation of the commerce clause; and in 1928 by a constitutional amendment transferred the assessment of electric light, heat, and power companies and transportation and transmission enterprises to the State Board of Equalization, but failed in 1929 to enact a statute thereunder so that taxation of these enterprises is attempted without statutory sanction or direction.

COURT DECISIONS

The Washington Law of 1925 requires a graduated filing fee, not exceeding $3,000 and an annual graduated license fee, not exceeding $3,000 based on authorized capital stock. In line with the Alpha Portland Cement case (268 U. S. 203) and the Airway case (266 U. S. 71), the law was held to impose a burden upon interstate commerce, and as taxing property beyond the state. That a maximum was fixed, and that in fact the burden would not be heavy if the tax were related solely to intrastate business done, could not save the tax (Cudahy Packing Co. *vs.* Hinckle, 72 L. ed. 269). The New York corporate license tax upon a foreign corporation having no par stock, and based upon issued stock, on each share a tax of six cents per share, is valid. It is distinguished from the Airway case by being based upon issued, not upon authorized, capital stock (People of New York *vs.* Latrobe, U. S. Sup. Ct. May 13, 1929). A Missouri corporate franchise tax on no par corporations, apportioned to the business done in the state or property owned, is not invalid merely because a part of the property is used in interstate commerce. This decision probably cannot be taken to authorize any privilege tax if only the subject be doing some intrastate business, though when read literally, it might seem to support such a conclusion (International Shoe Co. *vs.* Shartel, U. S. Sup. Ct. May 13, 1929).

In Arkansas a foreign corporation is not "doing business in the State" by merely bringing suit as trustee for the collection of interest on bonds, and may, therefore, bring action attacking acts of the legislature decreasing the area of a bonded school district, such acts being void as impairing the obligation of contract to the bondholders (12 S. W. [2nd] 881). A foreign corporation may not be barred from doing business in the state or having its contracts impaired by not paying the state license taxes or by not appointing a resident agent in the state for service of process. (143 Atl. 703). The back taxing statute of Arkansas is not invalid by reason of applying to corporations only (White River Lumber Co. *vs.* Arkansas, U. S. Sup. Ct. May 27, 1929). In the absence of a statute requiring the payment of a fee for the extension of a corporate existence no such fee can be collected in Michigan (217 N. W. 334). A tax on retail chain stores of $50 for each store operated is void because of unreasonable classification, the business of such stores not being essentially different from that of other merchants (144 S. E. 701). Ohio has abandoned discriminatory premium taxes on insurance companies. The rate is now two and a half per cent of premiums on both foreign and domestic companies.

COURT DECISIONS IN BANK TAXATION

Macallen Case.—The so-called Macallen case was decided May 27, 1929 (Macallen Co. *vs.* Massachusetts, 49 Sup. Ct. 432). It was raised by a manufacturing company seeking to enjoin the state from including income from tax exempt securities in its taxable income. The distinction between the tax on the income of a bank and the excise tax on the bank measured by the bank's income was that under the latter it was deemed permissible to include income from taxable securities in the taxable income. The case was first decided in favor of the state. The United States Supreme Court, reversing the state court, held that the state could not do indirectly what it could not do directly. The result of this decision is to eliminate one of the alternative methods of taxing banks. The tax on the income of the banks is now identical with the excise tax.

The bankers had argued that by means of the excise tax the states might tax adequately both state and national banks. If, however, the banks may deduct from their gross income that part which is derived from tax-exempt securities, the amount of income taxable will in many cases be so small that the tax on the banks will be quite inadequate both when compared with the amounts which they have previously paid and when compared with the tax burdens resting on other business enterprises. Massachusetts and the American Bankers Association, with others, petitioned the Supreme Court for a re-hearing which was denied. The status of national bank taxation is therefore final until changes are made by Congress.

Bank Shares.—Numerous cases, following the Richmond decision, have held that bank shares cannot be taxed at a higher rate than competing moneyed capital. The definition of competing moneyed capital is still so indefinite that almost any intangible property may be held to be in competition with the business of national banking. Most of the cases, however, have involved state banks which sought taxation at a rate not exceeding that imposed upon national bank shares. In Iowa, Nebraska, North Dakota, South Dakota, and Montana it has been held that the state banks cannot be taxed at a higher rate than the rate applicable to national bank shares. In a recent Kansas Case (Voran *vs.* Wright) decided by the Kansas Supreme Court Nov. 9, 1929, and involving the same controversy, the court went out of its way to declare the entire low-rate tax on intangibles unconstitutional. Curiously enough, the court ordered the banks to pay taxes computed at five mills, the rate applicable to intangibles in general under the law that was held unconstitutional. The case was instituted by the state banks for the purpose of securing judicial sanction of a five-mill rate on the state bank shares. It is not now clear whether hereafter the state banks must pay taxes on their shares at the rate of five mills as they were ordered to do for the year in question, or whether they must pay taxes at the general property rate or whether they are to be entirely free from taxes. The Tax Commission has asked the Court for an explanation.

Two decisions, in Florida (115 So. 261) and Oregon (26 Fed. 2nd 957), have held that when competing moneyed capital escapes taxation either through deliberate failure of the assessor to enter it on the tax roll or through inability to reach such property, the bank shares cannot be taxed at all. Inasmuch as it is impossible in practice to reach but a small part of competing moneyed capital and since it will not be difficult for the banks to prove that such discrimination exists to a material extent, it appears now to be uncertain whether bank shares can be taxed at all in states having the general property tax.

STATUTORY CHANGES

The most striking changes were the 1929 bank tax laws of California, Oregon and Washington. These three laws are alike in that they impose excise taxes under the fourth alternative of Section 5219 R. S. U. S. In Washington the rate is five per cent, and the tax applies only to banks and other financial institutions. In California at the rate of four per cent and in Oregon at five per cent, the tax applies to corporations in general. All corporations are allowed offsets for personal property taxes which are of no avail to the banks since they pay no personal property taxes. The offsets are limited to ninety per cent of the excise tax liability (75 per cent in California). Under the Macallen decision mentioned above it would seem that the new bank tax laws of the three Pacific states have become unworkable. A movement is on foot to test the contention that these three laws are sufficiently distinct from the Massachusetts case to permit the use of the excise tax without deduction of the income from tax-exempt securities. That this contention will be upheld is doubtful and the three attempts may not succeed.

In Nebraska and Montana a different solution has been attempted. The new Nebraska law affecting the taxation of intangibles creates two classes. Class A consists of money, certain United States obligations, bank deposits and drafts, and is subject to a tax of two and one half mills on the dollar. Class B includes bank stock and generally all intangibles except those in Class B, and is subject to a tax of eight mills on the dollar. A similar relief to the tax on bank stock in Montana is attempted by a different method. Formerly the bank shares were required to be assessed at forty per cent of their true value. The 1929 law puts the bank stock in a different class and makes them assessable at thirty per cent of their true value. Money and credits in general are assessed at 7 per cent of their true value. It would seem therefore that the new method of taxing banks is quite as much in violation of Section 5219 as was the old. However, the new law was sponsored by the bankers and they have not contested the law. A change made in Iowa also gives some relief in a still different manner. By a law of

1929, Iowa taxes the surplus and undivided profits at the rate of six mills while the capital stock proper is subject to the general property tax rate.

THE PROBLEM OF BANK TAXATION

Attempts at Solution.—In many cases banks have paid their taxes at the full general property tax rate. In other cases they have compromised in some form with the taxing authorities, either as to the percentage of the taxes due which they are willing to pay, or as to the rate at which they are willing to pay taxes, or as to the percentage of the valuation at which they are willing to have their shares assessed. In many cases taxes paid by the banks under protest will have to be refunded although the money has been spent by the taxing authorities. To raise the money for the refunding of all unlawfully collected taxes will necessarily increase the taxes on other property, and it will prove annoying to everybody. Such bargaining between the taxpayers and the taxing authorities under doubtful authority is very unfortunate.

Compromise Sought.—The representatives of the American Bankers Association and of the Association of States on Bank Taxation have been negotiating for a compromise under which banks might be adequately taxed. Especially since the Macallen decision has it been asserted by the states and admitted by the banks that Section 5219 must be amended to permit greater freedom in taxing banks. At the conference of the National Tax Association at Saranac Inn in September of this year a joint conference was held, and a tentative agreement reached on a proposed amendment of Section 5219. The draft of the proposed amendment is far from clear, but two features emerge which would differentiate Section 5219 if amended as proposed. The states would be permitted to tax the shares of national banks as they might require, providing the tax burden was no heavier than the burden on state financial institutions. For this concession the Association of States on Bank Taxation has long been contending. Another feature is the possible use of a specific tax on the shares. The actual conditions under which the taxes on banks are collected are more chaotic than ever before.

INHERITANCE TAXES

By Alzada Comstock

Professor, Mount Holyoke College

Federal Estate Tax.—Agitation for the repeal of the Federal estate tax was less evident in 1929 than in 1928, a fact which was apparently due in large part to the exceptional prosperity of the country in the first three quarters of the later year. The rates in force were those voted in 1926, when the 40 per cent maximum rate was reduced to 20 per cent, the estate exemption increased from $50,000 to $100,000, and the credit for inheritance taxes paid to the states raised from 25 per cent to 80 per cent of the Federal tax on the estate.

State Inheritance Taxes.—With the exception of one subject,—reciprocity legislation,—1929 was uneventful in the field of state inheritance taxation as well. In dealing with the difficulty of multiple inheritance taxes, however, great gains were made. The reciprocity movement which matured in 1929 had its origin in 1925, when the four important industrial states of Connecticut, Massachusetts, New York and Pennsylvania agreed not to tax the intangible personal property of decedents resident in states which had adopted similar laws. Real property and tangible personalty, being taxed in the state where it was situated, was not affected by the new legislation. In 1927 the states of California, Georgia, Illinois, Maine, Maryland, New Hampshire, Ohio and Oregon were added to the list; and in 1928 a reciprocity law was passed by

Mississippi. In the legislative sessions of 1929 reciprocity laws were adopted by 14 more states: Arkansas, Idaho, Indiana, Iowa, Michigan, Missouri, New Mexico, North Carolina, South Carolina, Texas, Washington, West Virginia, Wisconsin, and Wyoming. After subtracting the states which did not tax the intangible personal property of non-resident decedents (Colorado, Delaware, Massachusetts, New Jersey, Rhode Island, Tennessee, Vermont and Virginia; and, under certain conditions, Louisiana and Nebraska), this left only nine states which taxed all intangible personal property left by non-resident decedents: namely, Arizona, Kansas, Kentucky, Minnesota, Montana, North Dakota, Oklahoma, South Dakota and Utah. On the whole, although this group included the states of incorporation of certain important railroads and mining companies, these were states outside the principal industrial and commercial areas. The reciprocity laws were not uniform in character, and there was a tendency to tax decedents of the states without inheritance tax laws as well as those of states which imposed inheritance taxes but did not reciprocate. The states which imposed no inheritance tax remained as in the previous year: —Alabama, Florida, Nevada and the District of Columbia.

AUTOMOBILE TAXES

By Beulah Bailey

Librarian, New York State Department of Taxation and Finance

Revenue Receipts.—During 1928 according to the U. S. Bureau of Public Roads, there were 24,493,124 automobiles licensed in the United States and 10,178,344,771 gallons of gasoline were used in these machines. The total gross receipts from the registration fees were $322,630,025 and from the gasoline tax $304,871,766. The Federal excise tax was repealed May 29, 1928 but the revenue up until that time was $20,386,176. The municipal taxes on automobiles are estimated at about $20,000,000 and the personal property tax at $140,000,000. This makes a total tax bill of $807,887,967 on this one industry. This is, in truth, not a total tax bill on the industry as corporation taxes and general property taxes on the real and personal property of the manufacturing companies are not included. The increase in registration fees over 1927 is $21,568,893 and in gasoline tax revenue $46,032,953.

Expenditures.—Of the $627,501,791 from the registration fees and gasoline tax, $419,926,863 or 67% was expended for state highways, $117,780,006 or 18% for local roads, $49,445,906 or 8% for state and county roads, and $15,828,600 or 2% for administration. The remaining 5% was expended for miscellaneous purposes.

Motor Bus Taxes.—During the last five years the special tax on common carrier buses has increased about 80%. Motor buses have proved a lucrative source of revenue as has the gasoline tax but it has been the tendency of the legislators in many states to increase the tax rate on both of these bases until the taxes have become an actual burden. The average tax per passenger automobile is $22 a year, truck $50, common carrier truck $303 and bus $512. This year Georgia placed buses under the supervision of the Public Service Commission and levied a tax ranging from ¼ to ¾ of 1 cent per mile traveled, varying according to the size of the bus. Florida placed all bus companies operating outside of city limits, except school buses, under the jurisdiction of the Railroad Commission. From this Commission they must obtain a certificate to operate, and pay a mileage tax ½ cent per mile for 10 passengers buses, ¾ cent for 20 passenger buses and 1 cent for buses of more than 20 passengers. Wyoming levied an additional *ad valorem* tax on common carriers engaged in interstate business and increased the registration fee payable by transportation companies. Texas changed the measure of the tax from horse power to weight. South Dakota and Maine both levy a new excise tax on automobiles which includes buses. In Nebraska the fees on motor buses operating in more than one county shall be paid to the state treasurer rather than the county treasurer as are the fees of motor vehicles in general. Oregon repealed the $4 per passenger tax on commercial carriers outside of municipalities. In New Jersey the excise tax on motor buses operating in interstate commerce was held unconstitutional and repealed. Connecticut came into conflict with the courts as to the distinction between interstate and intrastate business. The former was 1¢ for each mile traveled and the latter 3% on the gross receipts. Under the new law there is no distinction between the two but the tax is 3% on the gross.

Registration Fees.—Motor vehicle registration fees were reduced in Connecticut, Vermont and Oregon. In the last two states there was, however, an increase in the gasoline tax rate. Oregon changed the distribution of the tax from ¾ to the state highway fund and ¼ to the counties to ⅔ to the former and ⅓ to the latter. Montana and Texas changed the basis of registration fees from horse power to weight. Nebraska made a farm relief gesture by refunding any fee on farm trucks in excess of $8.00. In Illinois two new classes have been created for the purpose of fixing fees on trailers and semi-trailers. This increases their maximum fee from $50 to $100.

Excise Tax.—The present day tendency is towards the abolishment of the personal property tax on automobiles. January 1, 1929, in Massachusetts, an excise tax in lieu of the personal property tax went into effect. This tax has proven a great success both from the standpoint of revenue produced and administration. Automobiles are assessed at a certain percentage of list price, allowance being made for annual depreciation, and the rate is the "state rate." The tax is collected by local collectors and the revenue goes to the localities. This year a similar tax was levied in Maine and Wyoming. In both states the tax is measured by the list price, depreciation being taken into consideration, and is to be collected by the local collectors in lieu of other local taxes. California has a constitutional amendment pending, permitting a new registration tax in lieu of all personal property taxes. Florida, by amendment, proposes to eliminate the *ad valorem* tax on automobiles. South Dakota levied an additional registry tax of 3% of list price, the repealed Federal tax. This tax is in lieu of nothing. The money goes into the state general fund to be used for the reduction of the general property tax.

COGNATE SOCIETIES

BANKING AND CURRENCY

American Bankers Association, 110 E. 42nd St., New York, N. Y.

American Institute of Banking, 420 Lexington Ave., New York, N. Y.

Investment Bankers Assn. of America, 531 First Natl. Bldg., 33 So. Clark St., Chicago, Ill.

Investors' Vigilance Committee, Inc., 42 Broadway, New York City, New York.

National Association of Mutual Savings Banks, 11 E. 36th Street, New York, N. Y.

New York Clearing House Association, 77 Cedar Street, New York, N. Y.

Private Bankers Association, 31 Nassau St., New York, N. Y.

United States League of Building and Loan Assns., 22 East 12th St., Cincinnati, O.

INSURANCE

Actuarial Society of America, 256 Broadway, New York, N. Y.

American Institute of Marine Underwriters, 56 Beaver St., New York, N. Y.

American Institute of Actuaries, 720 No. Michigan Ave., Chicago, Ill.

American Life Convention, Omaha, Nebraska.

American Marine Insurance Syndicate, 56 Beaver Street, New York, N. Y.

Association of Casualty & Surety Executives, 1 Park Ave., New York, N. Y.

Association of Life Insurance Presidents, 165 Broadway, New York, N. Y.

Board of Underwriters of New York, 56 Beaver Street, New York, N. Y.

Casualty Actuarial Society, 75 Fulton Street, New York, N. Y.

National Aircraft Underwriters' Association, 1 Park Ave., New York, N. Y.

National Association of Life Underwriters, 11 W. 42nd Street, New York, N. Y.

National Association of Mutual Casualty Companies, 730 Fifth Ave., New York, N. Y.

National Association of Travelers' Aid Societies, 23 West 43rd St., New York, N. Y.

National Board of Fire Underwriters, 85 John Street, New York, N. Y.

National Bureau of Casualty & Surety Underwriters, 1 Park Ave., New York, N. Y.

National Council on Compensation Insurance, 151 Fifth Ave., New York, N. Y.

National Council on Workmen's Compensation Insurance, 80 Maiden Lane, N. Y. C.

National Fire Protection Assn., Boston, Mass.

Surety Association of America, 160 Broadway, New York, N. Y.

DIVISION VIII

PUBLIC RESOURCES AND UTILITIES

FEDERAL SURVEYS AND MAPS

By Joseph Henry Wheat

Secretary, Board of Surveys and Maps of the Federal Government

---

SURVEYING AND MAPPING SERVICES

The Geological Survey is the most productive of the mapping organizations. It is engaged in making the basic topographic map of the entire area of the United States. It is also engaged in making a geologic map of the United States and Alaska, involving both topographic and geologic surveys. In conducting investigations relating to surface and underground waters, classifying the public lands and supervising the engineering phases of mineral leasing, the resulting maps are incidental.

The Coast and Geodetic Survey is one of the oldest surveying bureaus of the Government. It is charged with the survey of the coasts of the United States and its possessions and with the publication of navigational charts of those regions. The Coast and Geodetic Survey is also charged with determination of geographic positions by astronomic observations and by triangulation and traverse, and with the determination of elevations by spirit leveling, in the interior of the United States and Alaska.

The General Land Office is the oldest surveying and mapping bureau of the Government. The act of Congress, approved May 18, 1796, provided for the appointment of a Surveyor General and directed the survey of the lands northwest of the Ohio River. A subsequent act of Congress, approved April 25, 1812, provided for the establishment of a General Land Office under the direction of a commissioner. This Bureau makes rectangular surveys of the public lands. These are published in the form of township plats. The Bureau issues annually a wall map of the United States showing the extent of the public surveys, national parks, monuments and forests; Indian, military, bird, and game reservations, and other useful information. It also issues maps of the 29 public-land States, Alaska, and Hawaii.

The Hydrographic Office is charged with topographic and hydrographic surveys in foreign waters and on the high seas, and in the preparation and printing of maps and charts required in navigation on those waters.

The Corps of Engineers makes special topographic maps of areas of military importance and has made topographic maps of a few quadrangles not surveyed by the Geological Survey, besides revising some of the older topographic maps of the Geological Survey.

The Forest Service publishes general geographic maps of national forests and topographic maps of portions of them.

The Bureau of Reclamation publishes topographic maps of many of the Federal irrigation projects.

The Office of Indian Affairs has mapped portions of the Indian reservations.

The Mississippi River Commission has published a series of maps showing the profile of the river and the topography along the shores, extending from the source to the mouth of the river.

The International (Canada) Boundary Commission has published a series of topographic maps extending approximately 1 mile on each side of the United States-Canada boundary line and along the east boundary of Alaska.

The Lake Survey publishes hydrographic charts of the Great Lakes for navigational uses.

The Topography Branch of the Post Office Department compiles post-route maps for all the States, Alaska, Hawaii, the Samoan Islands, Guam, Canal Zone (Panama), Porto Rico, and the Virgin Islands. It also compiles rural free delivery maps of many of the counties in each of the States.

The Bureau of Chemistry and Soils publishes maps which show the character of the soils in the area covered. A single soil map will usually cover the area of a county.

The Bureau of Public Roads publishes maps of the United States showing the Federal aid system of highways and also maps of some of the States carrying more detailed information of the same character.

TRIANGULATION AND LEVELING

The plan for the standard topographic mapping of the United States calls for a complete network of triangulation based on the standard (North) American datum. The geographic position of Meade's Ranch, Nebraska, is the accepted datum for the North American continent, as the United States, Canada, and Mexico have adopted it and have made their position adjustments to conform to it. The plan also calls for spirit level elevations based on mean sea level. The existing first and second order triangulation and leveling have generally been executed by the Coast and Geodetic Survey, but the Lake Survey has executed first-order triangulation along the shores of the Great Lakes with other connecting lines. Third-order triangulation and leveling in the interior of the country has been done by the Geological Survey and the Corps of Engineers. The Mississippi River Commission has established many third-order triangulation stations and level bench marks along the Mississippi River. The International (Canada) Boundary Commission has established numerous first-order triangulation stations to fix the boundary between the United States and Canada. Horizontal and vertical control work of this character accomplished during the past year is given in the summary of the year's work.

AIR NAVIGATION MAPS

Strip Maps vs. Sectional.—During the past year the Board of Surveys and Maps in discussing the relative value of strip maps versus sectional area maps for air navigation agreed that sectional area maps for military purposes are a necessity and are now required for commercial flying. More flying is being done away from the established airways than on them and this volume of miscellaneous flying will greatly increase as the public buys airplanes for private use. The nature of air transportation suggests the idea of private owners. They will represent the greatest body of purchasers, flying everywhere seeking new scenes and less traveled ways. Maps are imperative, and it is evident that no strip map program could ever hope to satisfy all such demands. There are already more airplanes in the hands of miscellaneous users than are owned by the transport companies flying scheduled routes. Strip maps have served their purpose in the past as air navigation aids for the routes flown, for with lighting facilities, radio beacons, radio telephones, intermediate fields, day markings, weather and dispatching service now rendered by the Federal Government over the main traveled routes, airway strip maps become practically unnecessary in so far as civilian flying is concerned.

Sectional Maps and Charts.—The Board approved a program for the production of sectional area navigation maps on a scale of 1:500,000, or about 8 miles to 1 inch, each sheet to cover six degrees of longitude by two degrees of latitude, conforming to the indexing of the International Millionth Scale Map. In accordance with this action of the Board, the Department of Commerce has begun its publication program of sectional area navigation charts to cover the United

States. The compilation of these general flying charts is being done by the Coast and Geodetic Survey.

AERIAL PHOTOGRAPHY

Utility of Photographs.—All Government offices are keenly interested in the application of aerial photography to mapping. The Geological Survey, the Coast and Geodetic Survey, the Corps of Engineers, the Hydrographic Office, and the Forest Service are particularly interested in the developments of cameras and methods to obtain greater accuracy in photographs and to facilitate their use on map work. Aerial photographs are especially valuable in standard topographic mapping, being used by the Geological Survey on this work to a large extent in compiling planimetric bases for use in the field. They are also used as an aid in making military maps of the several types required for defense, the training of troops, the practice of artillery firing, and other military activities, as well as for use in the charting of coast lines and stretches of coastal country difficult and tedious to survey by ground methods. The Air Services of the Army and Navy supply aerial photographs for use by Government agencies in mapping, but some work of this kind has been contracted for by commercial firms.

Apparatus for Stereoscopic Mapping.—Developments in the stereoscopic use of aerial photographs have resulted in the construction of instruments by means of which the relief of the terrain is revealed in such clearness that contours may be drawn from them directly on the map with a higher degree of accuracy than can be obtained in the field by ground methods. An apparatus for stereoscopic mapping has been installed in the Geological Survey office, and after conducting a series of tests over a period of several months the instrument is now being used in the production of standard topographic maps, more particularly in country difficult to map by ordinary ground methods.

Mapping Projects Based on Aerial Photographs.—Base maps compiled from aerial photographs by the Geological Survey during the fiscal year ending June 30, 1929, covered a total area of 10,013 square miles. Aerial photography was also used extensively by all field parties of the Hydrographic Office during 1929 for topographic details as well as for reconnaissance. The Coast and Geodetic Survey carried on office work in the compilation of aerial photographic data in connection with the project of mapping the coast of Florida from Cape Sable to Cape Romano. The photographs were especially valuable for information concerning details of the area covered by mangrove swamps. Aerial survey work on the Nez Perce National Forest was continued by the Forest Service. Approximately 170 square miles of the northern part of the forest was photographed and a mosaic map embracing 22 square miles of this area was made on a scale of six inches to the mile. An aerial survey detachment of the Bureau of Aeronautics of the Navy was sent to southeastern Alaska in the spring to continue the photographing of this region, which was commenced by a similar expedition during the summer of 1926. This photographic work was requested by the Interior and Agricultural Departments and will be especially useful to the Geological Survey, the Forest Service, and the Bureau of Public Roads. The area covers approximately 12,000 square miles, 4,000 square miles of which was photographed by June 30, 1929.

THE YEAR'S SURVEYS

The Geological Survey in 1929 completed topographic mapping in the United States and Hawaii aggregating 17,333 square miles. Of this total 12,956 square miles represents new surveys, 4,049 square miles resurveys, and 328 square miles revisions. In connection with the topographic work 8,542 miles of spirit levels and 5,068 miles of transit traverses were run, and 211 triangulation stations were occupied.

The Coast and Geodetic Survey completed a total of 67,297 square miles of hydrographic surveys and a total of 1,862 square miles of topographic surveys in the United States, Alaska, Hawaiian Islands and the Philippines. Triangulation of second and third order included the determination of 891 geographic positions. An area of 18,850 square miles was covered by first-order triangulation and 1,290 miles of first-order levels were run.

The Corps of Engineers covered 791 square miles in topographic mapping in continental United States and 470 square miles in the Panama Canal Zone.

The Hydrographic Office surveyed a total area of approximately two thousand, three hundred square miles.

The General Land Office made original surveys and resurveys aggregating 3,381,687 acres.

The Forest Service completed 1,169 square miles of topographic surveys and 845 square miles of drainage surveys. In connection with mapping 9 third-order and 27 fourth-order triangulation stations were occupied and 163 miles of third-order levels were run.

The Bureau of Chemistry and Soils completed 20,650 square miles of soil surveys during the past year.

STATE GEOLOGICAL SURVEYS

By M. M. Leighton

Chief, Illinois Geological Survey

GENERAL

Because of the great mineral wealth of this country and because an intelligent exploration, recovery, and conservation of the mineral resources requires technical information of a sort which can be secured and published only by government agencies, forty states maintained geological surveys; during 1929, appropriations to 36 of these bureaus amounted to approximately $1,518,030. This was further increased by about $432,337 from coöperating Federal agencies, counties and local organizations. About 105 full-time, technically trained men and 300 part-time participated in this effort.

FUNDAMENTAL STUDIES

West and Southwest.—Arizona carried on detailed geologic mapping of the Jerome quadrangle and the Patagonia mining district. Arkansas prepared a report on the St. Peter and the older Ordovician sandstones of northern Arkansas, and published a report on the upper Cretaceous formations of southwestern Arkansas, and a state geologic map, and has in press reports on the structure and stratigraphy of the gulf coastal plain of Arkansas. California reprinted its state geological map and undertook the preparation of geologic and economic reports on Colusa, Fresno, Glenn, Kern, Lake Lassen, Modoc, Napa, Riverside, San Francisco, San Mateo, and Sierra counties. Colorado has in press a report on the geology and mineral resources of the Alma mining district, Park County, in coöperation with the U. S. Geological Survey, and is preparing a coöperative report on the Bonanza mining district, Saguache County. Idaho is geologically mapping the Bayhorse quadrangle, near Challas, in coöperation with the U. S. Geological Survey, issued a report on the geology and ore deposits of the Lava Creek district, and is issuing a similar report on the Clark Fork district.

South.—Florida is preparing a general report on the geology of the state, is studying the invertebrate paleontology, and has issued a state geologic map and a report on extinct land mammals. Georgia prepared a geological map of the coastal plains.

Illinois continued its stratigraphic and paleontological studies of the Silurian, Pennsylvanian, and Pleistocene Systems, with special work on the Foraminifera of the Pennsylvanian, the paleobotany of the Pottsville, the flora of the coal balls of the various coal beds, and the profile of weathering of the various glacial drift sheets. Drill cuttings from 54 wells were studied and correlated, and geologic mapping was undertaken or continued in the Alton, Brighton, Brussels, Carlinville, Geneva, Glasford, Griggsville, Hardin, Marseilles, and Ottawa quadrangles. Fiel correlation studies were made of the Pennsylvanian formations of western Illinois. Reports were published on the gastropod genus Yvania, physiographic divisions of the area covered by the pre-Illinoian drift sheet, recent discoveries of pre-Illinoian till in southern Illinois, and a report is in press on the geology and mineral resources of the Alexis quadrangle.

Middle West.—Indiana carried on investigations in stratigraphy, glacial geology, paleontology, and published a report on fossil vertebrates. Iowa carried on stratigraphic paleontological studies of the Cretaceous, Devonian, Maquoketa, and Decorah formations, and on the glacial deposits. It published papers on the deep wells of Iowa, well-water recession, a contour map of the upper surface of the St. Peter sandstone, pre-Illinoian Pleistocene geology, Maquoketa formation, and a map showing glacial drift sheets. Kansas investigated its Pennsylvanian stratigraphy and paleontology, began the compilation of a detailed geological map of the state, undertook the areal geologic mapping of five counties, made a laboratory study of deep well cuttings, and published the geology of Cowley County. Kentucky published a new state geological map and three large reports. Michigan prepared and published a geological map of Iron County, continued its survey of the sand dune problem, and carried on a number of stratigraphical problems. Minnesota undertook the preparation of a state geologic map, made structural and areal studies of the Rove slate and Logan sills, and carried on mapping of the Anorthosite of northeastern Minnesota. Mississippi prepared and published a volume on the state's economic geology and geography and is studying its data of subsurface stratigraphy. Missouri studied the stratigraphy of the Ozark region, the paleontology of the lower Mississippian and Cambro-Ordovician, undertook a study of stratigraphy through insoluble residues, and published geological reports on Ste. Genevieve and Lawrence counties and the Potosi-Edgehill quadrangles. Montana is preparing a report on the geology of the Bannack and Argenta mining district and on the structure of Mission and Flathead ranges.

New York has been mapping the areal geology of the Adirondack region, the Hudson River valley, and areas in central and western New York. It published reports on the glacial geology and geographic conditions of the lower Mohawk valley, the structure of the drumlins exposed on the south shore of Lake Ontario, recent finds of Quaternary mammals at Syracuse, influence of erosion intervals on the Manlius-Helderburg series of Onondaga County, new or little known fossil fishes from the Hamilton shales of New York, a new Coccosteus from the Portage shales of western New York, and granite phacoliths and their contact zones in the northwest Adirondacks.

Ohio carried on geologic mapping in Holmes, Adams, and Highland counties and completed manuscript reports on Jefferson and Lucas counties. The identification of the corals of the Devonian system was continued.

Oklahoma began a detailed study of the Wichita Mountain granite and a systematic collection and study of Oklahoma fossils. The following bulletins were published:—Pennsylvanian of the Ardmore Basin; Structure of the Ouachita Mountains; Faunal Chart of the Mississippian and Morrow formations of Oklahoma and Arkansas; and the following are in press: Sedimentation of the Anadarko Basin, and Dolomites of Western Oklahoma. Pennsylvania made a special study of the stratigraphy of the Silurian, continued a study of glacial deposits and recent physiographic history, and coöperated with the U. S. Geological Survey on special paleontological studies and in the geologic mapping of several quadrangles.

Tennessee made a detailed study of the areal geology and stratigraphy in Mascot-Jefferson City zinc district, made a reconnaissance of the Mississippian formations in middle Tennessee, studied crypto-volcanic structure in Wild Creek basin, and carried on field work on micro-paleontology of the Cretaceous and Tertiary.

Texas published reports on the depositional history of the Redbeds and Saline residues of the Texas Permian, notes on the Permian Chinati series of west Texas, the Paleozoic of the Pedernales River valley in Gillespie and Blanco counties, the Pennsylvanian Ostracoda from Menard County, a Tegua Eocene delta in Brazos County, Upper Cretaceous Taylor ammonites, Ostracodes of the Cretaceous of North Texas, and stratigraphic and structural studies in north-central Texas.

Other States.—Virginia continued a survey of stratigraphy and structure of the valley of Virginia, and made a reconnaissance of Piedmont geology, and a survey of the Eagle Rock quadrangle. Vermont carried on physiographic and reconnoitering work, and published the sixteenth report of the State Geologist. Washington carried on limited studies in stratigraphy, paleontology, Pleistocene geology in the Chelan National Forest, and laboratory studies for a quadrangle report nearing completion. West Virginia carried on a field study of Pennsylvanian, Mississippian, Devonian, and Silurian rocks in Greenbrier County, the last to be surveyed. Numerous paleontological collections in the Mississippian, Devonian, and Silurian have been identified and described, and a study of Permian microscopic forms has gone forward. Detailed geological reports were published on Pendleton and Pocahontas counties. Wisconsin continued stratigraphic studies of the Cambrian formation, reprinted the state geological map, and a report on the geology of the Gogebic Range.

STUDIES IN MINERAL RESOURCES

Oil and Gas.—Alabama published a special report on petroleum possibilities. Arkansas is studying the oil and gas possibilities of the Paleozoic area of Arkansas and the structure and stratigraphy of the Gulf Coastal Plain. Illinois virtually completed a report on the oil and gas development and possibilities of northern Crawford county, published a report on the Dupo oil field, petroleum production and development in 1928, the Darmstadt anticline and related structures in St. Clair County, and anticlinal areas near Renault, Monroe County. Indiana published a report on the geological conditions in the Siosi field and prepared a report on some structural features of the upper surface of the Trenton limestone. Kentucky mapped the areal, structural, and oil and gas geology of 25 counties and mapped detailed structural geology of 9 quadrangles. Michigan published a report on oil and gas and special contour maps of oil and gas fields and districts. It also organized its work of oil and gas-well supervision. Mississippi undertook the preparation of a report on the state's oil and gas possibilities. Missouri undertook magnetometer surveys for geologic structures. New York carried on economic investigations of oil and natural gas. New Mexico made a general survey of the mineral resources of the state. Ohio continued its work of collecting oil and gas records and began the drawing of special contours on the oil sands. Oklahoma prepared and published reports by counties on the oil and gas geology for Okfuskee, Latimer, Le Flore, Haskell, Sequoyah, Kiowa, and Washita counties, made weathering tests of Oklahoma asphalts, and prepared manuscript reports on Tulsa, Cotton, Johnston, and Murray counties. Pennsylvania completed a statewide oil and gas survey, a four-year study of the Bradford oil fields, made progress in the study of the stratigraphy of the oil sands, and made progress in a detailed laboratory study of oil sands. Tennessee revised its report and map on the oil and gas fields of eastern Clay county. Washington made some examinations of areas being tested for oil and gas. West Virginia has completed the installation of a chemical laboratory for the study of coal, oil, gas, water and other minerals. Wyoming supervised the production of oil and the production of gas on the school section lands of the state.

Coal.—Alabama published a report on Lignite and on the Wattsville basin of the Coosa coal field. Illinois continued its preparation of a comprehensive bulletin on the Illinois coal fields, its stratigraphic mapping and correlation of Coal Measures strata in southern Illinois, and started an investigation on the ash of Illinois coal in coöperation with the Engineering Experiment Station. A report was published on coal stripping possibilities in Saline and Gallatin counties, near Equality, and a non-technical report was issued on Illinois coals. Iowa sampled and tested its coal for weathering and coking qualities in coöperation with the Chemical Engineering Department of the State University. Ohio completed the manuscript report on analyses of the coals of the state, and sampled and analyzed 35 samples in coöperation with the Division of Mines of the State Department of Industrial Relations. Oklahoma is mapping and preparing a report on the segregated coal lands of Eastern Oklahoma in coöperation with the U. S. Geological Survey, and published a bulletin on analyses of Oklahoma coals. South Dakota made a reconnaissance of the coal in the northwest portion of the state. West Virginia made a detailed stratigraphic study of coal, mapping the outcrops and computing tonnages.

Ore Deposits.—Arizona has in press a revised and enlarged edition on manganese deposits and on field tests for common metals. It also completed its study of the ore deposits of the Jerome quadrangle and the Patagonia mining district. Arkansas completed its field work on the lead and zinc district of northern Arkansas and prepared a magnetic report on the bauxite area of central Arkansas. California studied the mineral resources of 12 counties and published a report on machines for recovery of gold and platinum. Colorado carried on coöperative work in the Alma mining district, Park County, and the Bonanza mining district, Saguache County. Idaho examined some gold placers along the Secash River near Burgdorf, completed the field work on the mineral resources of the region about Orofino, and published reports on the ore deposits of the Lava Creek district and the Clark Fork district. Illinois completed its report on "the geology of the fluorspar deposits of Hardin County." Michigan continued its magnetic geologic survey between Houghton and Calumet in the copper-bearing district and began a magnetic geologic survey in the Marquette iron-bearing district in the "hard ore" area west of Ishpeming. Missouri continued its study of the Joplin lead and zinc district. Montana studied the Bannack and Argenta mining districts and published a report on the Kevin-Sunburst and other oil and gas fields of the Sweetgrass Arch. New Mexico studied the ore deposits of Socorro County, particularly the Magdalena district, and coöperated with the state Tax Commission in accumulating data on the mining properties of the state. Oklahoma completed a detailed study of the lead and zinc area of Oklahoma. Virginia made an inventory of its mineral resources. Wisconsin continued its areal and magnetic surveys and completed 11 townships in Washburn and Burnett counties, and also made valuations of the iron mines in Wisconsin for the State Tax Commission. Nevada issued the report on the mineral resources of southern Nevada and is preparing a report "Mercury in Nevada."

RECLAMATION AND IRRIGATION

By Hugh A. Brown

Assistant Director of Reclamation Economics, Department of the Interior

BOULDER CANYON

The outstanding features of Federal reclamation during the past year were the approval of the Boulder Canyon Project Act December 21, 1928 by President Coolidge, and the proclamation of President Hoover June 25, 1929, putting the Act into effect. The Boulder Canyon Project Act contemplates three main construction items, as follows:

Boulder Dam.—First, the construction of the 700-foot Boulder dam, in Black Canyon, where the Colorado River forms the boundary between Arizona and Nevada. The dam will raise the present surface of the river 550 feet, or almost precisely the height of the Washington Monument, and will create a reservoir with a capacity of 26,000,000 acre feet of water, or sufficient to cover the State of Virginia to the depth of a foot. The reservoir will impound the surplus waters of the Colorado for use in irrigation and will also regulate the flow of the river so as to protect the lands in the valleys adjacent to the river below the dam and in the Imperial Valley of California, from overflow, water shortage, and silt accumulation, the three chief menaces to agriculture in that region to-day.

Hydroelectric Power.—Second in importance is the development of 1,000,000 horsepower of hydroelectric energy at the dam, with 550,000 horsepower available at all times. The Act authorizes an appropriation of $165,000,000, but does not appropriate any funds for construction, and before such appropriations are made contracts must be entered into sufficient in the judgment of the Secretary of the Interior to meet operation and maintenance expenses and to insure repayment of the construction cost within 50 years, together with interest at the rate of 4 per cent. A number of conferences have been held with representatives of the various states, municipalities, and power companies interested in contracts for the sale of power, with every prospect of their early consummation.

Irrigation Canal.—Third, the construction of an all-American Canal from Laguna dam on the present Yuma Federal irrigation project, Arizona, or from some other suitable diversion dam, to connect with the present irrigation system in the Imperial Valley of California, a distance of about 75 miles, and an extension to the Coachella Valley of California. A contract has been entered into with the Imperial Irrigation District and the Coachella Valley County Water District, providing for a maximum expenditure of $100,000, payable equally by the two districts and the United States, under which the Bureau of Reclamation has placed a force of men in the field to make the necessary surveys and investigations to determine definitely the location and estimated cost of the proposed canal. The construction of the canal will obviate the present difficulties incident to the carrying of water from the Colorado River to the Imperial Valley through a canal which now runs for sixty miles in a great loop through Mexico.

Camp For Workmen.—Plans have been outlined for the construction of a railway line to the Boulder dam site and the erection of a camp for the engineers and workmen. The camp site has been located where it will have the benefit of the prevailing winds. Every care will be given to the health and comfort of the workmen. Elevators, with a lift of 1000 feet, will carry them to and from their work in the bottom of the canyon. The buildings in the camp will house from three to four thousand people, of whom about 1000 will be employed on the work. A domestic water supply will be pumped 1000 feet from the Colorado River.

ECONOMIC SURVEY OF RECLAMATION

Backward Projects.—The results on a majority of the Federal irrigation projects amply justify the National policy. A great wealth in land has been created, farmers in general are prosperous, and the payments required under the Government contracts are being made, but on some projects development has been slow and settlers are struggling in all stages of discouragement, with the result that delinquency in payments has been the inevitable result. On these backward projects a large percentage of the farms are either not irrigated or are poorly cultivated, with consequent low returns. Reclamation requires more than canals and reservoirs. The qualifications of settlers, the kind of agriculture that should be followed, and in general, those factors which determine earning power and well-being and contentment of the people of the communities created are as important as the engineering factors. A careful study of these backward projects seemed essential if a definite determination was to be made of the possibility of their future success.

Scope of Survey.—The Secretary of the Interior accordingly approved an economic survey of reclamation during the summer of 1929, designating for this purpose certain Federal projects where the irrigation works are completed, others where the works are being constructed, and several private projects in financial distress where the aid of the Government was being solicited. The survey was under the direction of the Director of Reclamation Economics of the Bureau of Reclamation, utilizing the services of three economic experts outside of the bureau, three project superintendents, two members of the economic division of the bureau, and one district counsel. These special investigators made an investigation of sixteen projects or divisions of projects, and in addition reports were received from six other projects, where the water users desired that economic conditions on their projects be also considered. The reports from all these projects are to be submitted to a special committee of economists for correlation and submission to the Secretary of the Interior of conclusions and recommendations, with a view to determining what can and should be done to improve conditions on the backward projects and to aid Congress in enacting desirable legislation.

RECLAMATION POLICY

President Outlines Plans. — On August 21, 1929, in a letter to Joseph M. Dixon, first assistant Secretary of the Interior, President Hoover outlined tentative plans for a new reclamation policy for presentation to the Public Land States Governors' Conference in Salt Lake City, August 26 and 27. In this letter the President stated that the vital questions are to re-orient the direction of the Bureau of Reclamation primarily to the storage of water and to simplify its administration.

Water Storage.—He suggested that the work of the bureau on "all new projects might well be confined to the construction of dams and such construction as results in water storage, and at the completion of such construction the entire works be handed over to the states with no obligation for repayment to the reclamation fund except such revenues as might arise from electrical power and possibly in some cases from the sale of water until the outlay has been repaid or, in any event, for not longer than, say, fifty years." The President also suggested that "there are certain instances of insufficiently capitalized community owned irrigation projects which are at the point of failure, for which the reclamation fund might be made a proper vehicle to rescue homes that are now in jeopardy." He also stated that "a further activity which might be considered for incorporation in the Reclamation Service would be the authorization to join with the states and local communities or private individuals for the creation of water storage for irrigation purposes," adding that "the primary purpose of these suggestions is thus to devote the Federal Government activities to the creation of water storage and a reduction of other activities within the states. Under such arrangements the states would have hte entire management of all new reclamation projects and would themselves deal with the irrigation land questions and land settlement."

Administration.—The President emphasized that "it is not suggested that the states should take over the administration of the established projects, but that the system should be set up for future undertakings," and concluded with the statement that "the question of the advisability or inadvisability of opening new areas of land for cultivation in the face of present obvious surplus of farm products does not arise because the activities outlined herein will only affect farm production ten or twenty years hence by which time we shall probably need more agricultural land." With a view to making a thorough study of public land and reclamation problems, the President stated that he proposed to appoint a commission of nine or ten members, at least five of whom should be chosen from among leading citizens of the public land states, and requested the coöperation of the Governors in submitting names of men whom they deemed qualified to serve on such a commission.

RECLAMATION FINANCES

Appropriations.—The appropriation act of March 4, 1929, for the fiscal year ending June 30, 1930, made available $14,409,600 for reclamation, distributed as follows: Examination and surveys, $312,000; storage system, $5,307,000; canal system, $4,287,400; lateral system, $981,500; drainage system, $800,000; power system, $125,000; irrigable lands, $11,200; telephone system, $6,000; operation and maintenance, $2,325,500; and miscellaneous, $254,000. Among the larger and more important items mentioned in the Act are $2,000,000 for continuation of construction of the storage and canal systems on the Owyhee project, Oregon-Idaho; $1,500,000 for the canal system of the Gravity Extension Unit of the Minidoka project, Idaho; $1,270,000 for the canal and lateral systems of the Kittitas division of the Yakima project, Washington; $1,000,000 for the storage system of the Yakima project, $800,000 for the construction of Deadwood dam on the Payette Division of the Boisé project, Idaho; $796,000 for the continuation of construction of the Vale project, Oregon, and $596,000 for the canal and lateral system of the Riverton project, Wyoming. The Act also made available $71,000 for the economic work of the bureau, including investigations to determine the feasibility of new projects, examinations of soils, classification of land, and land settlement activities. No provision was made to continue the investigations of opportunities of planned group settlement in the South.

Receipts and Expenditures.—The income of the Bureau of Reclamation during the fiscal year 1929 was $9,851,438.62, or $548,108.37 greater than in the previous year. The operation expense for the year was $1,786,928.81, an increase compared with the previous year of $23,976.14. The payments received for operation and maintenance were $1,920,500.57, or $77,115.71 greater than in the previous year. Excess of operation and maintenance receipts over expense for the period amounted to $133,571.76, compared with an excess of $80,432.19 in 1928. The amount appropriated for construction was $12,286,500, compared with $9,869,000 the previous year, both figures exclusive of reappropriations. The amount expended on construction was $7,898,304.69, compared with $6,966,449.25 the previous year. The construction payments were $4,387,813.80, an increase of $932,049.11. The total payments in the fiscal year 1929 amounted to $6,308,314.37, compared with $5,299,149.55 in 1928, an increase of $1,009,164.82.

Revolving Fund.—Works under construction involve an ultimate expenditure of about $80,000,000, under the 10-year program announced in 1927, which provides for the construction of new projects authorized by Congress, exclusive of the Boulder Canyon project, and the completion of old projects. The Bureau has a revolving fund of about $172,000,000 invested in reclamation projects. As the settlers refund to the Government the cost of construction and operation, the fund is replenished and money becomes available for the construction of new projects. Regular repayments are being made to the Government by 22 projects, and only two completed projects have not yet reached a repayment status. Other accretions to the revolving fund come from the sale of public lands, the receipts from which source amounted to $647,236.95, and from royalties from oil leases, which added $1,852,785.03 to the fund.

Total funds made available for expenditure to the end of the fiscal year 1929 since the passage of the Reclamation Act of June 17, 1902, are summarized in the following table:

Accretions to the reclamation fund to June 30, 1929.

Public land sales	$109,631,974.40
Oil leasing receipts	35,970,437.61
Potassium act receipts	52,684.69
Receipts under Federal water power act	59,209.22
	$145,714,305.92
Special appropriation and bond loan	25,393,312.35
Less repaid	9,000,000.00
	$ 16,393,312.35
Collections for construction operation and maintenance, and incidental operations.	85,583,323.75
Total	$247,690,942.02
Disbursements	239,679,814.45
Balance	$ 8,011,127.57

CONSTRUCTION

The canals, ditches, and drains constructed by the Bureau of Reclamation since the passage of the reclamation act of June 17, 1902, total 16,557 miles, and the excavation of earth, rock, and indurated material amounts to 276,822,500 cubic yards. The bureau has constructed 122 tunnels with a total length of 175,536 feet; 148,462 canal structures; 11,631 bridges, with an aggregate length of 277,449 feet; 14,043 culverts, with a total length of 535,396 feet; 4,811 flumes, with a total length of 853,022 feet; and has laid 4,091,096 linear feet of pipe. The bureau has also constructed 1,680 buildings, 1,203 miles of roads, 110 miles of railroad, 3,350 miles of telephone line, and 2,056 miles of transmission line. The 35 power plants on the projects develop 166,128 horsepower of electrical energy.

Gibson dam, on the Sun River project, Montana, was completed; Echo dam, on the Salt Lake Basin project, Utah, was about 50 per cent completed; and excellent progress was made on the construction of the 405-foot Owyhee dam on the Owyhee project, Oregon-Idaho. Work continued on the construction of Easton division dam and the canal system of the Kittitas division of the Yakima project, Washington; on the main canal and Harper division dam on the Vale project, Oregon; and construction was begun on the Deadwood dam on the Payette division of the Boisé project, Idaho. This dam is on the Deadwood River, a branch of the South Fork of the Payette River in Idaho, and is about 60 miles northeast of Boisé. The dam will afford a regulated flow for the power plant at Black Canyon, on the Payette River, which supplies power for pumping water for the irrigation of a number of irrigation districts. Under present conditions there is a shortage of water for power purposes during the peak of the irrigation season, and the construction of Deadwood dam will relieve this condition and make 8,000 kilowatts of firm power available throughout the season. The dam will be of the concrete arch type, with an upstream radius of 290 feet. It will be about 160 feet in height above the foundation bedrock, and about 700 feet long on the crest.

IRRIGATION DEVELOPMENT

Area and Crops.—In 1928, the latest year for which statistics are available, the irrigated area of the Federal irrigation projects was 1,442,080 acres, an increase of 63,090 acres over that of the preceding year. The area cropped was 1,489,240 acres, an increase of 57,680 acres. The gross value of crops grown on these projects was $81,077,750, an increase of $9,030,550 compared with 1927. The average value of crops per acre was $54.44

compared with $20.32 for the ten leading crops, comprising about 90 per cent of the acreage of all field crops, for the United States as a whole. In addition the Government irrigation works furnished water under Warren Act or other water service contracts to 1,235,020 acres, of which 1,192,030 were cropped, producing crops valued at $62,495,320. In other words, the total value of crops grown in 1928 on irrigable land by means of water furnished from the works of the Bureau of Reclamation was $143,573,070, an increase over that of the preceding year of $10,365,860.

Crop Distribution.—As in the past several years, alfalfa hay was the leading crop, from the standpoint of acreage, grown on the Federal irrigation projects in 1928. This crop was harvested on 436,488 acres, representing 29.3 per cent of the total cropped area of 1,489,240 acres. Cotton stood second, with 229,560 acres, 15.4 per cent of the total, followed by wheat, which was grown on 178,470 acres, or 12 per cent. No other crop accounted for as much as 5 per cent of the total cropped acreage.

Crop Value.—From the standpoint of gross crop value, cotton again led with a value for both lint and seed of $22,450,340, or 27.7 per cent of the total value of $81,077,750 for all crops. Alfalfa hay was second with a gross value of $15,915,058, representing 19.6 per cent of the total value, followed by garden truck valued at $8,885,234, or 10.9 per cent. Sugar beets were valued at $5,592,982, apples at $4,783,873, and wheat at $4,571,620.

In the accompanying table a distribution is given by large groups of the crops grown on the Federal irrigation projects in 1928.

CROPPED ACREAGE AND VALUE, 1928

Crop	Acreage Cropped		Value		
	Total	Per cent	Total	Per cent	Per acre
Cereals	339,806	22.8	$ 7,576,430	9.3	$22.30
Other grain and seed	45,285	3.0	1,786,179	2.2	39.44
Hay and forage	810,106	54.4	20,745,188	25.6	25.60
Vegetables and truck	131,454	8.8	13,294,111	16.4	101.13
Fruit and nuts	50,043	3.4	9,073,831	11.2	181.32
Sugar beets	71,250	4.8	5,592,982	6.9	78.50
Cotton lint and seed	229,560	15.4	22,450,340	27.7	97.80
Other miscellaneous	99,367	6.6	558,689	0.6	5.62
Duplicated cropped acreage	287,631	19.3	....	....	.....
Total	1,489,240 [1]	100.0	$81,077,750	100.0	$54.44

[1] The dry farmed area of this total amounted to 103,680 acres, producing crops valued at $838,950.

Livestock and Equipment.—In 1929 the total value of livestock and equipment on the 24 operating Federal irrigation projects was $42,062,091, an increase over the preceding year of $5,306,106. The inventory showed 75,206 horses, valued at $3,909,739; 10,433 mules, $946,207; 67,494 beef cattle, $4,185,105; 126,526 dairy cattle, $10,021,443; 413,125 sheep, $4,153,528; 123,577 hogs, $1,155,172; 1,935,707 chickens, turkeys, ducks and geese, $2,498,919; 38,826 hives of bees, $257,055; and 2,170 rabbits, $2,780. Including the value of purebred and scrub sires of beef and dairy cattle and the value of brood sows, the total value of livestock amounted to $27,699,384 and that of farm equipment to $14,362,707.

LAND SETTLEMENT

New Entries.—Although the settlement of the irrigated lands has been difficult problem during the past few years, the indications are that there is a more definite movement on the part of country-minded men and women to take up available land where there is a reasonable hope of success.

During the year the bureau opened to entry 28 public land farm units on the Tule Lake division of the Klamath project, Oregon-California, for which more than 90 applications were received by qualified entrymen. The successful applicants were carefully selected by a board of examiners on the project, on the basis of approved qualifications of industry, experience, character, and capital. Part 3 of the Willwood division of the Shoshone project, Wyoming, was opened to entry, containing 29 public land farm units, and although settlement of this division is slow, it is steady and offers a real opportunity to the man with sufficient capital to overcome the difficulties of the first few years of turning raw land into a producing farm.

At the close of the year announcement was made that water would be available in the spring of 1930 for the irrigation of about 4,000 acres of land in the Harper Division of the Vale project, Oregon, including 14 public land farm units which were opened to entry in the fall of 1929. These lands are in a developed community and were filed on promptly. A few settlers were obtained on the Lower Yellowstone, Belle Fourche, and Orland projects, where the Government holds options on farms in private ownership, for sale to settlers on amortized payments extending over a period of 20 years. Settlement on these projects has, however, been delayed because of the lack of habitable buildings on most of the vacant farms.

Operating Projects.—A tabulation of settlement and economic data on the 24 operating projects shows 40,788 irrigated farms, with a population of 153,663; 212 cities and towns with a population of 451,811; 687 schools; 689 churches; and 136 banks, with deposits of $147,732,900 and 248,373 depositors.

Southern Investigation.—Little was done by the Bureau on the study of opportunities for planned group settlement in the South, other than a preliminary investigation of a tract of land in North Carolina and four tracts in Florida. As a result of the activities of the Southern States Reclamation Association, bills were introduced in the Senate and House authorizing the creation of organized rural communities to demonstrate the benefits of planned settlement and supervised rural development. The Senate bill was favorably reported to that body by the Committee on Irrigation and Reclamation, but no further action was taken. No appropriation was included in the Appropriation Act to carry on this work during the fiscal year 1930.

THE INDIAN SERVICE

The Indian Service has 85 active irrigation projects ranging in size from a few acres to 120,000 and totaling 1,390,000 acres. Of these, approximately 709,000 are under constructed canals. The Indians are irrigating 124,000 and have leased 114,000 acres to white people. White people have acquired from the Indians and are themselves farming 159,000 acres. During the fiscal year 1928 $5,630,913 were expended on construction, operation, maintenance, and administration. The total amount expended for the same items is $43,406,520.

PUBLIC LANDS

By C. C. Moore

Commissioner of the General Land Office

OUTSTANDING DEVELOPMENTS

General.—The fiscal year ended June 30, 1929, was marked by the development of two public land matters of unusual importance, the first being a policy of oil conservation inaugurated by the President to meet various conditions, including overproduction, waste, and the abuse of the applications for oil leases, and the second various proposals, legislative and otherwise, evidencing the apparent need for careful and comprehensive consideration of the entire public land question with a view to revision of the laws relating to the use and disposition of the public lands.

Oil Conservation.—In furtherance of the plan to relieve the oil situation in so far as it might be affected by the discovery and production of oil on the public domain, the issuance of permits to prospect for oil and gas under the mineral leasing act of February 25, 1920 (41 Stat. 437), has been virtually suspended since March 12, 1929, and thousands of outstanding permits have been canceled because of failure of the permittees to comply with the requirements of law with respect to development work.

Public Land Policy.—Consideration of the public land question in general has been referred by the President to a committee of representative citizens with a view to recommendations which may be made the basis of a public land policy for presentation to Congress.

GENERAL LAND OFFICE

Disposition of Public Lands.—In original entries and selections of public land there was a gain of approximately 25 per cent over last year and an increase in the average output of the General Land Office including cases adjudicated and acres patented. Amounts collected from the sale and lease of Indian lands and from other sources, except receipts from mineral lands, were in excess of last year. Owing to the low price of royalty oil, receipts from mineral leases, etc., decreased by $792,398.48. The appropriation of $40,000 for fire prevention proved inadequate, and it became necessary to use funds otherwise available for protecting the public lands in fighting forest fires.

Receipts.—The total cash receipts from sales, leases, and other disposition of public lands (including receipts from copies of records, sales of government property, etc.) were $5,654,435, and from sales and leases of Indian lands $539,531.33, an aggregate of $6,193,966.33, the source

RECEIPTS FROM PUBLIC LANDS

Source of Receipts	Disposition in the Treasury			
	General Fund	Reclamation Fund	State Funds	Total
Sales of public lands	$ 46,304.12	$ 255,598.08	$ 10,242.25	$ 312,144.45
Fees and commissions	96,856.69	365,094.11	....	461,950.80
Bonuses, rentals and royalties from mineral leases	431,054.94	2,038,805.94	1,456,289.95	3,926,150.83
Sales of land and timber in Oregon and California railroad grant	104,018.88	....	580,000.00 [1]	684,018.88
Sales of land and timber in Coos Bay wagon road grant	131,151.16	....	43,717.05 [2]	174,868.21
Sales of reclamation townsites and campsites	....	8,152.44	....	8,152.44
Sales of timber in Alaska	7,464.28	....	....	7,464.28
Royalties on coal leases in Alaska	6,661.80	....	....	6,661.80
Rentals from fur farms in Alaska	1,280.00	....	....	1,280.00
Royalties and rentals from potash deposits	....	11,448.75	....	11,448.75
Power permits	12,302.16	....	....	12,302.16
Miscellaneous (copies of records, survey fees, sales of Government property, etc.)	47,992.40	....	....	47,992.40
Total	$885,086.43	$2,679,099.32	$2,090,249.25	$5,654,435.00
Sales and leases of Indian land	....	....	....	539,531.33 [3]
Aggregate	....	....	....	$6,193,966.33

---

[1] Estimated amount to be paid certain counties in the State of Oregon in lieu of taxes.

[2] Amount payable to Coos County as 25 per cent of proceeds of sales of lands and timber.

[3] Of the amount received as royalty from oil lands in the bed of the Red River, Oklahoma, 37½ per cent, amounting to $41,784.58, is paid to the State of Oklahoma, and the balance, amounting to $69,640.98, is credited to Kiowa, Comanche and Apache Indians.

of which and disposition in the Treasury are shown in the table given above.

Expenditures.—Total expenditures for the conduct of the business of the General Land Office and its field activities, including expenses of the district land offices, amounted to $2,237,303.38.

LAND ENTERED AND PATENTED

The area of public and Indian lands entered and allowed during the year aggregated 4,612,722 acres, of which 3,566,369 acres were allowed under the stock-raising homestead act. The area patented (title granted) amounted to 2,494,647 acres, of which 1,890,026 acres were patented under the homestead laws. In addition Indian fee patents were issued to the amount of 177,644 acres, supplemental patents releasing coal reservation under act of April 14, 1914, 40 acres, Oregon and California railroad land grant timber sales, 13,037 acres, coal deposits, 80 acres, and reissues, 65,971 acres.

PUBLIC LAND SERVICES

Field Service.—Field examiners investigated and reported on 15,948 cases, of which 5,474 were reported adversely, and 10,474 favorably. Civil suits brought through the Department of Justice as the result of field investigation numbered 31, of which 22 were won and 9 lost. More than $40,000 was expended or obligated in forest fire fighting on the public domain.

Cadastral Engineering Service.—This service, under the Commissioner of the General Land Office, surveys the public lands and prepares the technical record thereof. During the year, surveys and resurveys were executed in 25 states and the Territory of Alaska, under 243 groups. So much of this work as may be reckoned on a mileage basis aggregated 17,490 linear miles, at an average cost of $22.61 per mile. More than 3,000,000 acres of agricultural land were surveyed or resurveyed; approximately 200,000 acres of land in Utah deemed valuable for oil, and 95,000 acres of potash lands in the same state were surveyed; also 46,000 acres of oil-shale land in western Colorado. Surveys for the Forest Service, exclusive of boundaries and special surveys, amounted to over 700,000 acres, and resurveys over 320,000 acres. Surveys and field investigations were also made for the National Park Service, Federal Power Commission, the aviation division of the department of Commerce, and other government agencies. There were accepted and placed on file plats representing 2,593,034 acres of original surveys, and in addition 788,653 acres of lands resurveyed, an aggregate area of 3,381,687 acres.

Maps.—Copper plates for the map of the United States have been revised for printing the 1929 edition. State maps of Minnesota and the northern half of California have been printed and issued. The map of the southern half of California has been compiled and is now in the hands of the contractor for printing, and the drawing of the map of Nevada is nearing completion.

MINERALS

Applications and Permits.—Under the Mineral Leasing Act of February 25, 1920, 3,222 applications to prospect for oil and gas were received, and permits were granted on 2,488 applications; 16,562 permits were held for cancellation, and 8,906 were canceled. Following discoveries of oil under prospecting permits, leases were issued in 50 cases, and 3 leases were issued for which bonuses were paid. No new applications for prospecting permits have been received since the inauguration of the conservation policy on March 12, 1929. There were on hand at the beginning of the year 63 mineral entries, 1,164 received during the year and 1,173 disposed of; 158 applications for coal permits, leases and licenses, 2,278 applications received, and 2,218 disposed of; 32 potash permits were issued, and 8 sodium permits; 20 mineral applications were on hand, 312 were received, and 323 disposed of.

Receipts under the Mineral Leasing Act.—Receipts from bonuses, royalties and rentals under the law providing for the leasing of mineral rights on the public domain aggregated $3,884,878.68. The largest receipts were from lands in the State of Wyoming, the amount being $2,835,871.32. The second State in the amount of receipts was California, with $644,191.22. The other States in the order of receipts follow: Montana, $113,187.96; Colorado, $101,903.42; Utah, $88,886.62; New Mexico, $45,273.20; North Dakota, $30,411.28; Louisiana, $12,118.40; Alabama, $8,818; Idaho, $2,995.71; Nevada, $730; Washington, $451.55; South Dakota, $40. Pursuant to the Mineral Leasing Act each state receives 37½ per cent of the receipts from bonuses, rentals and royalties derived from the public lands within its borders, the reclamation fund receives 52½ per cent, and the other 10 per cent is paid into the Treasury of the United States and credited to miscellaneous receipts.

PREFERENCE FOR EX-SERVICE MEN

Pursuant to the provisions of public resolutions approved Feb. 14, 1920, Jan. 21, and Dec. 28, 1922, granting preference rights to veterans of the World War, there were opened to entry through release from segregation or withdrawal, or through survey or resurvey, public lands aggregating 237,891 acres, and 1,547,144 acres, respectively.

SPECIAL LEASES

Aviation.—Sixteen applications for leases of public land for aviation purposes were filed during the year, further action on all of which await compliance by the applicants with requirements of the regulations or report from the Department of Commerce.

Alaskan Fur and Grazing Leases.—Consideration was given 160 cases under the act of July 3, 1926 (44 Stat., 821), providing for fur farming in Alaska, and 10 leases were granted; action was taken on 79 applications for grazing leases in Alaska under the act of March 4, 1927 (44 Stat., 1452), but no leases have yet been granted; 1 lease was issued for land containing mineral springs.

LAND WITHDRAWALS AND RIGHTS OF WAY

Recreational Areas.—Twelve withdrawals have been made by the Department for recreational classification under the act of June 14, 1926 (44 Stat., 741), aggregating 69,089 acres, based on petitions by municipalities, counties or states.

Grazing Lands.—Eleven new stock driveways were established during the year and 12 modified, effecting the withdrawal of 92,287 acres and the release from withdrawal of 17,765 acres. The total gross area included in driveway withdrawals at the close of the fiscal year was 9,282,975 acres.

Rights of Way.—Applications for rights of way included 207 by railroads, 85 reservoir declaratory statements for stock-watering purposes, and 561 irrigation and miscellaneous applications, practically all of which were acted on.

RECLAMATION AND IRRIGATION

There are 26 active Federal reclamation projects in 14 of the public-land states, and 5 Indian reclamation projects. In addition to the usual business connected with entries on these Federal projects, 46 orders of restoration and 15 orders of withdrawal under the Reclamation Act were promulgated; the area restored totaled 217,476 and the area withdrawn 3,218,205 acres. The outstanding item was the withdrawal for the Colorado River storage, or the Boulder Dam project of 2,746,360 acres in Arizona, 237,440 acres in California, and 105,680 acres in Nevada. Other work of large volume under this heading handled by the office involved desert land entries, water exploration permits under the Pittman Act in Nevada, State irrigation districts, private irrigation projects, Carey Act withdrawals and segregations, and adjudication of state claims under the swamp land grant.

ACTIVITIES RELATING TO PUBLIC DOMAIN

Other activities of the General Land Office of great importance, which cannot be described within the space limitations of this article, include the adjudication of state grants and selections, railroad grants and selections, entries and sales of timber on the revested Oregon and California railroad and Coos Bay Wagon Road grant lands, tax claims by Oregon counties under the act of July 13, 1926 (44 Stat., 915), trespass on the public lands, logging operations in Minnesota, exchanges of lands in national forests, locations of scrip, etc. Detailed information on these and other subjects appertaining to the public domain may be found in the report of the Commissioner of the General Land Office for the fiscal year ended June 30, 1929.

The following table shows the area, by states, of the remaining vacant, unappropriated and unreserved public lands:

AREA OF PUBLIC LANDS, RECAPITULATED BY STATES

	Area, in Acres		
	Surveyed	Unsurveyed	Total
Arizona	9,065,367	7,846,000	16,911,367
Arkansas	205,933	....	205,933
California	14,459,737	5,749,684	20,209,421
Colorado	7,082,181	1,136,694	8,218,875
Florida	7,193	6,662	13,855
Idaho	8,851,615	1,882,805	10,734,420
Minnesota	197,996	....	197,996
Montana	6,821,824	78,320	6,900,144
Nebraska	28,960	....	28,960
Nevada	31,318,305	21,915,318	53,233,623
New Mexico	15,117,955	1,164,627	16,282,582
North Dakota	152,113	....	152,113
Oregon	13,134,730	92,411	13,227,141
South Dakota	402,670	....	402,670
Utah	13,192,133	11,955,734	25,147,867
Washington	937,701	14,202	951,903
Wyoming	16,218,036	817,501	17,035,537
Grand totals	137,194,449	52,659,958	189,854,407

LAND TITLES AND RESTRICTIONS

By Helen C. Monchow

Institute for Research in Land Economics and Public Utilities

Estate Rights.—Land titles may be regarded as the evidences of land ownership. A landowner's title is his authority by inheritance or purchase to hold a given piece of property, or to exercise certain rights and duties with respect to that land. The important element is the extent of these rights and duties or the degree of interest which the landowner has in the land to which he holds title. In law these rights are referred to as an estate in land. An estate (extent of rights in the land) and title (authority to exercise those rights) should be carefully distinguished. The largest estate known to law, which is at the same the most common form in use in the United States, is an estate in fee simple. Such an estate gives to its holder the largest possible bundle of rights in the land, but even so the ownership conveyed is not absolute. Various forces operate to regulate what the landowner may and may not do with his land.

Public Regulation.—Regulation of a landowner's activity may be carried on by either public or private agencies. Public regulation in the form of legislative or constitutional control is exercised through the police power of the state, and the powers of eminent domain and taxation. Police power regulation through such devices as building codes and zoning ordinances is a familiar type of control. Another and newer expression of the police power, and one which is becoming increasingly important as its scope and status are determined in the courts, is found in subdivision control ordinances according to which official planning bodies may regulate such matters as street widths and extensions, building lines, and lot sizes in the interest of orderly development of additions to the urban area. These powers have been sustained in Windsor *vs.* Whitney, 95 Conn. 357 (1920) and Ridgefield Land Company *vs.* Detroit, 217 N. W. 58 (1928). Taxation, although comparatively little used as a regulatory measure in the United States, has obvious potentialities for controlling the activities of landowners. Eminent domain controls by dispossessing the landowner on payment of compensation when his land is needed for some public purpose. By any or all of these means the state may limit what a landowner may do with his land. Such regulations become primary conditions of land ownership and affect all titles within the jurisdiction equally. They mark the limits and set the minimum standards within which private activity may take place.

Private control may be exercised in the absence of adequate public regulation or it may exist side-by-side with public control, performing a supplementary service. The most important form of private control is that exercised through restrictions in deeds. An important attribute of an estate in fee simple is the right of the owner to dispose of his land, within certain limits, as he sees fit. If, for one reason or another, he wishes to place limitations on his grantee's use of the land, he may do so under the right of free contract by inserting restrictive covenants or conditions in the deeds conveying the property. Restrictions of this kind are often used and are becoming more common, chiefly in subdivision developments. They have important bearing not only upon the rights and duties of the lot owner but also upon the city pattern. Their relation to city planning and zoning promises many interesting legal and administrative problems for the future.

Restrictive clauses in deeds may be classified roughly into two groups. The major restrictions in the first group have to do with regulation of the physical development of the area. Among these are building line restrictions; requirement that the subdivider or an agent shall approve plans of buildings to be erected in the subdivision; reservation of easements for installation of utilities; and the stipulation of what types of land uses shall be permitted and where they shall be located. The second or administrative group covers such points as duration of restrictions and procedure for their extension; provisions for enforcement; certain specific statements as to the powers and duties of the subdivider; and provisions for the administration of details, such as collection and expenditure of maintenance charges for upkeep of certain community features. Another important type of restriction is that which limits occupancy of the property by, and/or transfer of the property to, persons of the Caucasian race. Clauses of this nature are being used more frequently. Restraints on occupancy are rather generally upheld by the courts but the separate states differ widely in their attitudes. The validity of restrictions upon sale to Negroes in the District of Columbia was further attested in 1929 by the refusal of the Supreme Court of the United States in two instances to review decisions of lower courts upholding such restrictions.

Legal Status.—Such clauses inserted in deeds clearly limit what a landowner may do with his land; yet the courts will uphold such agreements in spite of their general antipathy to measures which appear to obstruct free use of the land or its free alienation. Certain standards must be met, however, in order to secure judicial approval. The courts will not require fulfillment of restrictive covenants if the character of the district has so changed as to make such enforcement inequitable. Moreover, restrictions must not be "unreasonable" or opposed to public policy; they must show clearly the intention of the parties to the contract;

and their position is materially strengthened if they show evidence of having been drafted in pursuance of a "general scheme" for development of the area. In short, the legal status of deed restrictions seems to be firmly established. Even in the few cases of record involving conflicts with zoning, *i.e.* where the property is already subject to deed restrictions at the time zoning control is imposed, restrictive covenants have been considered as creating property rights which are enforceable so long as they are not opposed to the public welfare and not inequitable in their operation. It seems likely that deed restrictions will continue to be an important force in controlling the development of urban land. They constitute a control device which is not only effective and available to all, but also applicable to a variety of details which could not otherwise be controlled.

Title Problems.—The increasing use of deed restrictions in subdivision development, not to mention the increase of subdivision activity generally in recent decades, suggests the title problems involved. Restrictions, like easements, profits, etc., are encumbrances annexed to an estate in land and lessen the value of that land for alternative higher uses. These limitations on the free use of property become part of the public record which must be examined at each transfer of title. Two considerations which flow from these facts may be mentioned. The first is the danger inherent in restrictive clauses that they may have become ineffectual for the purpose for which they were designed while still remaining on record as an obstacle to a marketable title. The solution lies in a careful limitation of the duration of the restriction to a period corresponding to its probable usefulness, or relief may be sought in the courts which have frequently rendered titles marketable by recognizing the inequity of longer enforcing the restrictive covenant. The second consideration is the strain upon the recording machinery caused by the greatly increased volume of real estate transfers and accompanying instruments. The increasing complexity of examining records of title has created an opportunity for business organizations to base insurance upon risks of defective title. These title insurance companies depend primarily upon the skill of their abstracting organizations rather than actuarial data on losses. Because the liability of the insurer is in doubt in the courts and because of many exceptions included in title policies, the service of title insurance is little greater than that of title registration and the purchaser of real estate has not complete protection.

PUBLIC SERVICE COMMISSIONS

By John Bauer

American Public Utilities Bureau

PURPOSES AND FUNCTIONS

Protection of Public Interest.—Public service commissions have been created in practically all the states. Their intended function is to safeguard and promote the public interests in public utilities, including railroads, street railways, busses, gas properties, electric light and power, telephones, telegraphs, water-works, and other properties and services which belong to the same general group. These industries have become recognized by fundamental law to be vested with a special public interest, which is due in part to the importance of the services in modern life, partly to the special privileges in the form of franchises and the right of eminent domain granted to the companies owning and operating the properties, but chiefly perhaps, to the fact that the industries are natural monopolies.

Control of Utilities.—Because of their public character, the properties and services are brought under special public control, although they are mostly organized under private ownership and operation. They are subjected to regulation not only in ordinary matters of police power, but also with respect to service, rates, return, and financial policy. Ordinary business is not subject to such control.

Commission Activities.—The commissions were primarily established to represent the public interest in the utilities, to safeguard the public against abuses of private ownership and management in fundamental services of a monopolistic character. Their creation may be regarded as organized effort to deal with monopoly; to preserve, on the one hand, the advantages of private business and initiative, but, at the same time, to prevent exploitation. Their work has included manifold activities, which have been steadilty expanding. They have furnished a clearing house of complaint and public information with regard to utilities. They have undoubtedly justified themselves, if considered only from the standpoint of receiving complaints and attempting informally to remove difficulties and causes of friction.

Major Duties.—The principal functions of the commissions have been three-fold: (1) To provide proper standards of service and to assure the installation of attainable improvements; (2) to fix reasonable rates, and prevent discrimination; and (3) to assure financial stability in the industry, to the end of protecting the investors and to make available constant funds for the expansion of the industries as needed for the commercial and social life of the communities.

PUBLIC SERVICE REGULATION

Criticism. — During recent years, extensive criticism has developed against the commissions. There has been a growing feeling that they have not performed their functions as intended by law and as expected by the public. This has included groups of economists and publicists, also newspapers, various semi-public organizations, and public officials who come in close contact with the general public.

New York State.—In some states, the criticism has already resulted in steps being taken toward the revision of the present system of regulation. The most distinct step has been taken by the State of New York, whose 1929 legislature provided for a commission to take a thorough stock-taking of regulation, to determine how it has worked, to show what defects and gaps have developed, and to report what changes there should be to make regulation a satisfactory instrument of public policy. This commission has provided itself with a technical staff of economic experts, and is making a thorough investigation of the entire subject of regulation. It is not limiting itself to the State of New York, but is bringing together the experience from all parts of the country. Public hearings were held to bring together all phases of criticism and constructive suggestions. The witnesses included members of the Public Service Commission, public officials, representatives of public organizations, students and experts in the field of public utilities, also representatives of the companies to present their side and to offer their suggestions of how regulation may be improved and how they may best perform their duties of public service.

General Functioning.—Four principal points of criticism were brought against the present system of regulation, and made the special object of investigation by the New York legislative commission. With respect to general function. The commissions had been intended to serve as positive agencies to represent the public interest, but they have been gradually transformed virtually into judicial bodies. Particularly in rate cases, they have come to sit principally as judges to receive evidence in legal form from opposing sides, and to base their decisions and orders upon the record thus made. In such hearings, they do not actively represent the public, but they pass judgment upon the public side as presented formally by other representatives. This is not only a shift from original intention, but results in inadequate public representation. The company side is, naturally, presented completely and efficiently. But the public side is often not represented at all, and, at best, only spasmodically and by individuals who usually are not sufficiently acquainted with the facts and issues.

The questions have thus been raised whether the commissions can be retransformed into direct public representatives, as originally intended; whether there should be a separation of functions, leaving the commissions as public representatives and creating special courts to deal with the judicial aspects of regulation; or whether the commissions should be recognized outright as courts, with the creation of special defenders or expert organizations charged with the positive responsibility of representing the public.

RATE MAKING

Standards.—With respect to rate making, the commissions do not have adequate standards or proper "measuring rods" of reasonable rates. They have been handicapped by lack of precise statutory provisions for rate making. Mostly, however, they have been limited by court decisions which have forced them into unworkable procedure. The Supreme Court of the United States laid down the general pronouncement that in fixing rates the commissions must allow a fair rate of return on the fair value of the properties used in the public service; and has indicated that no fixed policies and methods can be adopted for that purpose. There are, thus, two basic factors in determining the rights of the companies in rate making. Neither factor has been precisely defined, and each is left in variable form to shift in amount with changing conditions. The rate of return is largely dependent upon the variation in the money rates required for new capital. The fair value depends largely upon construction costs at the time of rate making.

Adjustment Difficulties. — Since neither quantity is precisely defined and established, its determination depends in each instance upon the evidence presented. Every rate adjustment, therefore, creates a sharp conflict of interest between the companies and the public. The one side is interested in establishing the maximum fair value and the highest rate of return; the other is equally interested in proving minimum figures. The evidence consists almost altogether of expert opinion, in the form of estimates. Wide differences are inevitably presented, and without the check of exact facts. The procedure, therefore, is cumbersome, drawn out, and extremely expensive. In a noted case before the New York Public Service Commission, the investigation has been strung out over five years, with a total expenditure of about $4,500,000 by the company alone, by the end of December 31, 1928,—and the case at this writing is not yet completed.

Rate Base.—The chief criticism is made against the undefined and fluctuating rate base, which is claimed to be financially unsound and administratively not workable. The question is whether on grounds of public policy the present varying rate base can be transformed, through statutory enactment, into a fixed quantity, which would be shown by the accounts, without incurring the objection of confiscation. There is also the question whether a fluctuating rate of return can be changed into a fixed rate representing the cost of money when funds are obtained for the acquisition of property. Such a change in system involves basic constitutional questions, and requires careful consideration of actual fair dealing with the companies in relation to the determination of public policy.

HOLDING COMPANY SYSTEMS

Operating Expansion.—A serious gap in regulation has developed with respect to the rapidly increasing holding company systems. When regulation was established, about twenty-five years ago, practically all the companies were locally owned or controlled, so that regulation was purely an intrastate matter confined to single municipalities. At the present time, many properties, especially in the electric field, have been brought together into interconnected systems which extend beyond individual communities, and reach beyond state lines. The chief instrumentality has been the holding company. The larger holding companies control properties scattered through most of the states.

Advantages and Disadvantages.—The holding company system doubtless has underlying economic advantages in consolidation and coördination, combined purchasing power, consolidated credit, and expert management. The control of the local properties, however, has thus passed from local groups, to outside parties, over which the commissions have little or no control. This situation has produced serious abuses, including the exaction of excessive management fees, unreasonable, legal and other expert charges, and the tapping off of profits through contracts for materials and construction. The question is, how the economic advantages of the holding companies may be retained, and how they may be brought under effective public control.

POWER TRANSMISSION

In the case of electricity, there has developed the further gap in the present system of regulation with respect to the transmission of power from one state to another. This constitutes interstate commerce; and, under Supreme Court decisions, is beyond state commission control. At the present time, this gap is not particularly serious, but it will become greater as the interconnections of transmission lines become more extensive. There are, therefore, questions of increasing importance whether state statutes may be formulated to reach adequately the condition; whether agreements may be made by neighboring states; or whether Federal regulation is necessary.

CONCLUSIONS

Besides these major points of criticism, there are also minor matters with respect to which the present system of regulation has proved to be inadequate, but as to which there are no special constitutional or legal questions. There are inadequacies in the control of security issues, new construction of property, accounting, operating and financial policies. The recommendations of the New York investigating commission will, doubtless, be studied critically all over the country, and may serve in part as a guide to the revision of systems elsewhere. The report will be made to the legislature during the 1930 session, with proposed modication of the statute to conform with the findings.

PUBLIC UTILITY MERGERS

BY H. M. OLMSTED

ASSOCIATE EDITOR, *The American City*

THE BIG BUSINESS TREND

Light and Power Combinations.—In the last few years we have been witnessing the combination of lesser business units into larger and larger ones to an unprecedented extent. This movement may be regarded as an outstanding manifestation of the general trend to "big business" that has been evident for a much longer period, and which has been the cause of opposition, or at least of great anxiety, on the part of representatives of the public interest. It has been active among public utilities, particularly in the electric light and power industry, where there has been greatly increasing use of the product, continual progress in technical methods of production, widely recognized prosperity, and great expansion.

Monopolistic Factors.—This activity is in line with the inherently monopolistic character of electric power and other enterprises commonly accepted as public utilities. The frequently heard epithet of "power trust" has been vigorously opposed on the plea that there is no single dominating corporation in the industry and, furthermore, that the customers are to a great extent free agents able to take the product or leave it. But it is undeniable that the mass of electric lighting consumers, and many of the users of power, who together constitute the large majority of the consumers, if not always representing as great a volume of consumption as the larger power users, are practically tied to the company supplying their territory; that in a given territory it is relatively uneconomic to have a duplication of companies; that the companies have a strong common interest that finds expression in and is nurtured by the National Electric Light Association; and now we are in the midst of a movement of actual consolidation of control on a larger and larger scale.

Merger Types.—The increasing integration of the electric industry and of public utilities in general has taken various forms. Aside from the manifestation of common interest by a trade association, the more tangible types of combination include the holding company, exercising control by majority or dominant stock ownership in its subsidiaries, which remain distinct corporations; the consolidation, which may be technically restricted to the absorption of two or more companies into a new corporation, and the merger, which can likewise be narrowly defined as an absorption of one or more companies by another existing one which retains its identity whereas that of the others is lost. Again, the consolidation or merger may be concerned with operating companies, holding companies, or both. The emphasis in the present discussion, however, is primarily upon the growth and significance of the movement, rather than its form or temporary status. And the word *merger* will be used broadly to represent such growth.

Scope of Control Movement.—An idea of the scope of this movement in the electric industry alone can be gained from the fact that the *Electrical World* listed 828 changes in utility control taking place in 1927, and 893 in 1928, involving billions of dollars each year. While these changes were not all in the nature of mergers, the outstanding characteristic, nevertheless, was that of combination into larger units. Complete figures for the current year to date have not appeared, but the movement has been very active and many large and important combinations have been brought about.

Future Outlook.—The break in the stock market that occurred at the end of October may be supposed to have checked the merger movement temporarily on account of the instability of security prices that was made evident thereby; but with the passing of chaotic conditions the steady continuance of the movement is to be expected, especially among companies whose securities have been affected alike; and if the market continues to rise from the low levels reached, a favorable condition for further combinations and the floating of new securities based upon economies hoped for, or predicted, will be produced.

SPECIFIC UTILITY MERGERS

Niagara-Hudson Power Corporation, formed by J. P. Morgan & Co., Drexel & Co. and Bonbright & Co., merged three holding companies, the Northeastern Power Corporation, the Mohawk-Hudson Power Corporation, and the Buffalo, Niagara & Eastern Power Corporation, with a total capitalization of about $450,000,000. This constitutes the largest power-producing system in the United States, with an annual output of 6,300,000,000 kilowatt-hours.

Commonwealth & Southern Corporation was organized by the Morgan-Drexel-Bonbright group, with controlling interests in the Commonwealth Power Corporation, the Southeastern Power & Light Corporation, and the Penn-Ohio Edison Co., with total initial assets of about $250,000,000.

The United Corporation was also formed by the Morgan-Drexel-Bonbright group, to acquire minority interests in the United Gas Improvement Co. (Philadelphia), the Public Service Corporation of New Jersey, and the Mohawk-Hudson Power Corporation, with capitalization of about $260,000,000. This and the preceding two companies are of interest, other than as to size, because of the more active entry of J. P. Morgan & Co. into the utility field.

Associated Gas & Electric Co. acquired all stock of W. S. Barstow & Co., which owns a substantial majority of voting stock in the General Gas & Electric Corporation, thus bringing under single control properties in many states aggregating some $500,000,000.

Pending Projects.—Among the combinations that have been under discussion is one proposed by the Mellon-Koppers interests for a chain of gas companies in the metropolitan section from Philadelphia to Boston, and the suggestion of a single electric company for the New York City boroughs of Manhattan, Brooklyn, Bronx and Queens, and Westchester County, with interconnection with the Niagara-Hudson company mentioned above, possibly involving power from the St. Lawrence River eventually. This consolidation would be part of the Consolidated Gas Co. system, a $1,000,000,000 group since the acquisition of the Brooklyn Edison Company last year.

Questions of Price.—One striking feature of some mergers during the rising stock market of the last year or two was the fanciful prices paid for some of the companies and for some of the municipally owned units, the merger movement including very active efforts for the absorption of such public enterprises. Some regulating commissions disapproved certain of these prices, claiming that they had no sound basis and were against the public interest.

UTILITY MERGER AGENCIES

Holding Companies.—The importance of holding companies is indicated by the fact that even in 1924, according to the studies of the Federal Trade Commission, 74.6 per cent of all electrical energy generated in the United States was produced by corporations under holding-company control; and this percentage has without question increased very considerably with the tremendous merger movement since then. In the development of large holding-company systems there are two fairly distinct geographical or physical types. One is the compact or at least contiguous interconnected system, bringing into play the technological advantages of combination; the other is an aggregation of separate, scattered properties, possibly on the theory that diversity fosters financial strength, a theory of dubious application in this case, and one which tends to be overshadowed by a merely acquisitive policy for speculative purposes, with resultant instability.

Investment Trusts.—A variation from the holding company dominating its system—the investment trust, owning minority holdings of more or less diversified character—has achieved increased prominence in the past year. The line between these two categories is not clear-cut, as some holding companies, notably the Electric Bond & Share Co., dominate without majority ownership. The United Corporation, previously mentioned, is of the nature of the investment trust.

FACTORS IN UTILITY MERGERS

Engineering.—The economic justification for the increasingly larger groupings of utility companies lies chiefly in the certainty or hope of engineering economies made possible by interconnection, and primarily affecting production. These are effected partly by the use of larger generating units in properly located power stations, and partly through the reduction of the number and total capacity of such units required for the adequate service of a given territory without danger from breakdowns. The formation of large companies or groups also permits of more efficient planning of plant requirements as to generation, transmission, and distribution.

Operation and Financing.—Economies in operation other than generation are also made possible by increase in the size of administrative units, at least within limits, particularly through the employment of high-grade engineering and managerial talent; and savings in financing or a facilitation of that process are likewise made possible, the last-mentioned factor being especially powerful as a consequence of the rapid expansion of the industry since the war. Advantages of this sort have been made much of, but it is not quite plausible that the merger movement could have attained its activity and extent merely from these causes; the factors of increasing use and widespread prosperity, mentioned at the outset, created a golden opportunity for a financiers' movement in the formation of bigger and bigger companies, with the attendant promoters' and brokers' profits, an increased volume of securities on the market, and the additional speculative feature of increases in market values of securities, as is frequently the psychological result of a well-advertised merger.

Regulation.—The various sound advantages mentioned above tend primarily to justify mergers of operating rather than of holding companies as being the most direct method of bringing them into effect. The creation or merging of holding companies may, of course, further some of these advantages, but this objective would seem to be subordinate or incidental to the more obvious financial benefits to the guiding spirits of such combinations. One of the prime reasons for the formation of holding companies rather than correspondingly large operating companies is the avoidance of state regulation of the dominant corporation of the utility group, which regulation would be expected to follow the open exercise of managerial functions. The detailed supervision of the management within such a group is frequently obtained by the creation of other corporations specifically concerned with such matters.

The merger movement among public utilities is of considerably different inherent character than similar movements in competitive industry, as commission control rather than competition is the generally adopted method of regulating the utilities. Therefore the old objections to consolidations, as typified in anti-trust legislation, are relatively inapplicable. The merger movement has, however, placed a tremendous responsibility if not an actual strain on the whole machinery of regulation. It is frequently asserted that the consumer will benefit very substantially by the economic advantages of mergers—and this has occurred to some extent—but it can hardly be maintained that his interests are adequately protected under the present kind of regulation. State commissions are increasingly realizing the desirability of some effective form of control over holding companies as well as over operating companies that affect a particular state; and the very general crossing of state lines by mergers that have taken place—a feature that will be increasingly evident—presents a grave problem of interstate, regional or Federal control.

DANGERS OF MERGER MOVEMENT

That the industry itself is not blind to possible dangers in the merger movement is indicated by an editorial in the *Electrical World* (June 29). After noting the creation of companies that are pools of minority stock holdings, instead of being the more orthodox type based on majority control of its subsidiaries, and stating that "other corporations are more or less investment trusts for the purpose of making money in the stock market, and still others are mergers of holding companies already in existence," it goes on to say of the effect of such developments upon the industry: "They may or may not jeopardize its future credit, and in addition, public relations might be affected by disappointed security holders. Another element to be considered is the possible introduction of banker management in addition to banker control. This would result in serious injury, because bankers are not the type of men to manage public service properties. . . If a detrimental reaction occurs, it will affect the industry itself and not the bankers who control the money pools."

MUNICIPAL OWNERSHIP

By H. M. Olmsted

Associate Editor, *The American City*

GENERAL OBSERVATIONS

Present Status and Progress.—The past year has shown consistency with the opinion, expressed in this section in previous years, that municipal ownership in the United States derives its status from practical rather than doctrinaire considerations, although it is frequently the subject of lively controversy, and that the question of its progress or decline is considerably in doubt. In the fields of transit, gas, the telephone and water supply, no outstanding change in the situation was apparent; in the more active province of electric light and power the decrease in the number of municipal systems that has been occurring for a few years continued, but as this tendency is still more marked among small private company systems it is not particularly significant as to municipal ownership in general. Statistically considered, there is thus a decline, the rate of which may be diminishing, according to indications mentioned later, but the position of public ownership as a method of dealing with the public-utility problem is not fundamentally affected, and so far as a conscious public attitude exists the efforts of the opponents of public ownership to influence it have presumably been weakened.

Public Attitude.—It is neither true that municipal ownership has been repudiated, as was confidently asserted by an American utility representative at the World Engineering Congress in Tokio nor likely that the American people would flock to the polls throughout the country to cast decisive majorities for public ownership of utilities in general. There are various factors the inter-relation of which decides the question in specific instances, and that of dogma is probably among the least effective. In so far as it does operate, the scales measuring this element seem to incline considerably to the anti-public-ownership side, as the extent of efforts at propaganda by the utility interests has continued to be revealed, with the far from negligible proportion of their vast resources directed to this purpose. The efforts and resources of doctrinaire public-ownership advocates seem puny in comparison.

Arguments for Public Ownership.—Certain arguments in favor of public ownership which might be considered somewhat theoretical in character have apparently weighed but little in concrete cases, although they seem among the most important from an ultimately practical point of view. In this class is the claim that public ownership is desirable because of its permitting a more thorough planning and correlation of community development. To be sure, this opportunity is by no means always taken full advantage of when it is present; the city of New York, for example, takes a naïve pride in permitting thousand-foot skyscrapers even when nearby subway stations are crowded to suffocation; but the New York transit situation is still far from being a unified municipal project, and the general matter of intelligent, coördinated planning of that city's physical development is still less unified, although the idea is being impressed in New York and is achieving tangible form in some other cities.

THE RAPID TRANSIT SITUATION

Chicago, Cleveland, Detroit.—The rapid-transit situation in metropolitan cities is recognized as a very vital community concern, affecting commercial prosperity and realty values as well as general public convenience, even though the likelihood of a vicious circle of congestion seems to be largely disregarded. Municipal ownership of this service is accepted as a normal though not universal situation. It does not dominate in current discussions of subways for Chicago, but a subway franchise to a private company was rejected by Cleveland voters at the November election; and while in Detroit an extensive scheme for municipal rapid transit was not approved at an election in the spring, this was not interpreted as encouragement for private development, and the Rapid Transit Commission has proceeded to plan a gradual construction program, involving in part the principle of special assessments for benefits to real estate.

New York has announced ambitious additions to the new city subway system, a considerable part of which is now constructed. The idea of a municipal power plant for the subways was discarded, for the present at least, in favor of purchasing power, the New York Edison Co., which would have reason to view such a move with considerable interest, having offered a contract at low rates.

COURT DECISIONS

Interborough Rapid Transit.—The United States Supreme Court rendered its decision in the Interborough Rapid Transit Co. case (see AMERICAN YEAR BOOK, 1928) on April 1, ruling against the company, but not clearly validating the subway contracts between that company and the city of New York. The power of the city to contract for private operation of publicly owned subways, with full control over the rate of fare, being thus still in doubt.

O'Fallon Railroad Case.—Another Supreme Court decision of fundamental although indirect interest in regard to municipal ownership was that in the O'Fallon railroad case, where the Interstate Commerce Commission had defended the investment theory of valuation, in substance, as against the reproduction-cost theory. The railroads' side prevailed, however, in the main, and privately owned utilities remain subject to the vagaries of conflicting valuation theories, without even a determination of the degree of weight to be accorded each.

Hartington (Iowa) Case.—A state decision of some general interest was that of the Supreme Court of Iowa in the so-called Hartington case (State *vs.* Interstate Power Co.), which decided that under Iowa law an electric light and power corporation could not attempt to destroy competition by lowering its rates below fair market value or below its rates in other similar communities, as the company in question had done when the city of Hartington decided to acquire a municipal plant by having it built by another corporation and operated thereby until the cost had been amortized. Certain other state decisions sustained arrangements of cities with equipment manufacturers for the payment of purchase prices out of future revenues, and dissolved injunctions to prevent such plans.

ELECTRIC LIGHT AND POWER

Municipal Central Stations.—During the past year there appeared the preliminary results of the 1927 census of electric central stations, an investigation made every five years by the United States Bureau of the Census as a part of the census of electrical industries. The total number of "municipal establishments" — municipally owned systems, whether generating or purchasing power for distribution —was given as 2198, a decrease of 15 per cent from the 1922 figure of 2581. The absorption of small private companies was naturally much more pronounced, the total number of "commercial establishments," separate central-station companies, each of which may serve one or many communities, appeared as 2137, a 43 per cent decline in five years. The proportion of total power output (both generated and purchased) of municipal establishments as compared with all, was 4.7 per cent in 1927; in 1922 it was 4.9 per cent.

Dorau Investigation.—Another statistical investigation of municipal ownership of electric light and power, not confined to a single year, and constituting a notable and painstaking study, was made public early in the year by the Institute for Research in Land Economics and Public Utilities, Chicago, Ill. This study had been carried on by Herbert B. Dorau, then research associate in the Institute and assistant professor of economics in Northwestern University School of Commerce, together with a staff at the Institute. It is reported by Mr. Dorau in a 102-page monograph published by the Institute and entitled *The Changing Character and Extent of Municipal Ownership in the Electric Light and Power Industry.* Therein it is stated that "a sizeable clerical force was engaged in the work for the better portion of three years," and that this report is preliminary to a larger study and interpretation still under way. The data collected and analyzed for this study relate to the period prior to 1928, and are the result of exhaustive efforts, by questionnaire, correspondence and the consultation of several hundred volumes of prior studies, census and state commission reports, and periodicals extending back for a long period of years.

The last year covered by this study, 1927, being the same as that of the last census investigation, it is of interest to note that the total number of municipal establishments reported in the former for the end of 1927 is 2320, or 122 more than the census shows. As the Institute coöperated with the Bureau of the Census, the discrepancy would seem to be due chiefly to the inclusion in the larger figure of all establishments about which reliable information as to their existence was secured, even if not by the return of a questionnaire, whereas if the census authorities did not obtain an official report, after repeated efforts, from a given establishment, the latter was not listed. The Dorau report also includes plants that are municipally owned but privately operated and not listed as municipal in the census.

Analysis of Dorau Study.—Among the interesting data reported in this study it is stated that a total of 3814 municipal establishments had made their appearance during the 46 years from 1882, when the first four originated, to the end of 1927, and that the largest number in existence at the end of any year was 3,066, in 1923. Of the 3,814 cumulative total, 827, or 22 per cent, had originally been private undertakings, the others being municipal from the start. Until 1926 the majority of municipal establishments generated all of the electric energy that they used, but in 1927 the number generating all was 995, while 106 generated part and purchased part, and 1219 purchased all of their power. As to the distribution of the 3814 cumulative total by population of the communities at the time of establishing the municipal enterprise, 1099, or 29 per cent, originated in places of less than 500 inhabitants; 2058, or 54 per cent, in places of less than 1000; 3225, or 85 per cent, in places of less than 2500. Ninety-two originated in places of 10,000 or more, of which there were 44 where the population was 20,000 or over.

Decrease in Municipal Electric Systems.—As indicated by the census and the Dorau study, a decrease in the number of municipal electric systems set in a few years ago and is no doubt continuing. This decline is due primarily to technological causes, including the development of large and highly economical generating plants which, with an extensive transmission-line network, can serve a large territory including many small communities at less cost for electric energy than small obsolescent plants, whether private or municipally owned, could furnish. The *Electrical World* has stated editorially: "At the time most of the systems were installed probably the only way these little communities could get the benefit of electric service was by action of the towns themselves. That such action was taken is evidence of community spirit and civic initiative." The Dorau study indicates that in some 60 per cent of the cases the municipality undertook to furnish electric service because no other agency was willing and ready to do so. With the fairly recent weaving of networks by the "high-line" companies and the increased ease with which they could obtain funds for expansion, the process of absorption of small private and municipal plants got under way. Certain factors, however, tend to slow up this process; they include the development and wide-spreading adoption of the Diesel engine as an improvement on steam for small municipalities, the fact that lightning and wind continue to be serious hazards as to uninterrupted functioning of transmission lines, and the long-overdue break in the stock market, with its attendant decline in market prices of public utility securities and in the consequent incentive toward the purchase of municipal plants at well-nigh fabulous prices.

DEVELOPMENTS IN THE WEST

Boulder Dam.—The disposition of the power to be generated at Boulder Dam, on the Colorado River, upon the completion of the dam by the Federal Government, was still undecided at the end of November, but Ray Lyman Wilbur, Secretary of the Interior, who has the chief responsibility for the decision, has suggested that the Metropolitan Water District of Southern California (a group of cities, including Los Angeles) take 50 per cent of the power, for pumping water taken from the storage lake to supply the District, Los Angeles to have 25 per cent additional for its municipal electric system, and the Southern California Edison Co. to have the remaining 25 per cent. Nevada and Arizona would be given opportunity to obtain percentages when needed. The predictions that there would be little market for the power at rates that the Government would have to charge did not materialize, there being keen competition for the power by various public and private corporations.

Power Transmission Plans.—It is estimated that the expenditures required to be made by the Metropolitan Water District will be in the neighborhood of $200,000,000 for the aqueduct, $30,000,000 for transmission lines, and several millions additional if the District should be called upon to install the generating equipment, instead of the Government doing so. The eleven cities comprising the District would presumably divide this on the basis of assessed valuations, under which plan Los Angeles would bear about 82 per cent.

East Bay Utility District, California.—The water-supply system of the East Bay Utility District in California, serving Berkeley, Oakland and neighboring cities, went into operation on June 23. The water is brought from Pardee Dam, 358 feet high, on the Mokelumne River in the foothills of the Sierra Nevada, by aqueduct and tunnel, discharging 50,000,000 gallons per day at present, one-fourth the ultimate capacity of the tunnels.

Centralia Development.—A smaller development on the Pacific Coast is that of Centralia, Wash., which has owned its electric distribution system for 30 years, and has now been authorized by the voters to build a hydroelectric plant, to cost about a million dollars and develop 11,000 horsepower, with a possibility of expansion to 30,000 hp.

MUNICIPAL OWNERSHIP RESTRICTIONS

Many differences exist among the various states with respect to the restrictions placed upon municipal ownership. Legislative or constitutional authority, now generally extended, is needed in the first instance; it is then usually necessary to hold a popular referendum in a given municipality, either on the question of policy or the issue of bonds, before the municipal enterprise can be entered upon; and consent of a state utilities commission sometimes must be had. On the other hand, a municipal plant can usually be disposed of to a private company with relative ease.

To quote the Dorau monograph: "In some jurisdictions an election must be held to pass upon this question, in others no referendum is required. In some states a community is free to follow its own dictates in the matter of sale to private owners; in others the state commission has more or less control over such transactions. In some states a municipality may compete with a private corporation and in others it may not. In some states again a machinery and procedure are set up for the purchase of private establishments, while in others no method exists whereby the community could easily obtain ownership of the electric establishment should this be desired. Debt limitations have frequently been imposed upon local communities with the effect of preventing the acquisition or building of electric establishments. In many other states, however, the indebtedness of public-utility undertakings is exempt from such limitations on municipal borrowing or the community is permitted to mortgage the utility property."

In a number of state legislatures efforts were made in the past year to improve the legal position of municipal utility enterprises, and to place safeguards about the disposal of a plant, equal to those affecting its acquisition by a city; bills were likewise introduced to give municipal plants greater freedom in selling electricity outside the city limits, and to assist neighboring cities to coöperate in joint power projects. Relatively little success was attained, but several state organizations of municipal utilities have been formed to further their mutual interests, and programs involving such points as those mentioned will no doubt be pressed at legislative sessions to come.

STREET AND HIGHWAY TRAFFIC

By Ernest P. Goodrich

Consulting Engineer, New York

TRAFFIC VOLUME

Growth.—During 1929, street and highway traffic increased in volume, if the total automobile registration, the total traffic accidents, and the consumption of gasoline can be used as measures. The growth in registration is shown by the following table:

AUTOMOBILE REGISTRATION IN THE UNITED STATES

(National Automobile Chamber of Commerce—1929 Estimated)

Year	*Passenger Cars*	*Motor Trucks*	*Total*	*% Increase*
1920	8,225,859	1,006,082	9,231,941	22
1921	9,346,195	1,118,520	10,464,715	13
1922	10,864,128	1,375,725	12,239,853	17
1923	13,479,608	1,612,569	15,092,177	23
1924	15,460,649	2,134,724	17,595,373	17
1925	17,512,638	2,441,709	19,954,347	14
1926	19,237,171	2,764,222	22,001,393	10
1927	20,219,224	2,914,019	23,133,243	5
1928	21,379,125	3,113,999	24,493,124	6
1929	22,448,000	3,300,000	25,748,800	6

AUTOMOBILE DEATHS PER 100,000 POPULATION AND PER 100,000 AUTOMOBILES REGISTERED

(National Safety Council—1920-1929)

Year	*Automobile Deaths per 100,000 Population*	*Cars Registered*
1920	10.4	123.0
1921	11.5	117.5
1922	12.5	111.6
1923	14.9	108.5
1924	15.7	101.2
1925	17.0	98.4
1926	17.9	95.5
1927	19.5	100.2
1928	20.8	101.7
1929	22.1	103.0

Gasoline Consumption.—The consumption of gasoline increased from 9,437,498,000 gallons used in 1927 in the country (exclusive of Illinois, Massachusetts and New York, which had no gasoline tax) to 9,679,947,000 in 1928, and an estimated consumption for the whole country in 1929 is over 10,000,000,000 gallons.

Road Mileage and Improvement.—Automobile ownership continued to grow at a higher rate than did the population of the country. The total mileage of surfaced roads increased almost exactly in the same proportion as the automobile registration. According to a report of the Bureau of Roads, 2530 miles were improved in the 48 states during 1928 and it is estimated that nearly 3000 miles was completed during 1929.

Congestion and Surveys.—The concentration of business in clusters of high buildings was stated as a major cause of traffic congestion. Several extensive traffic surveys were carried on, notably one for the Cleveland district.

HIGHWAY ENGINEERING

Road Surfaces and Grades.—Students of traffic conditions appreciate the work which is being done by highway and municipal engineers in the improvement of road surfaces, grade alignments and other factors. It was shown, for example, that road crowns could be materially reduced in the arid areas. During the year several cities and states instituted radical improvements in paving specifications and methods. Certain new materials like rubber block paving were discussed to some extent. Minimum roadway widths of 20 feet with painted center lines and smooth shoulders were advocated. By-pass highways were widely considered. Because a highway can carry no more traffic than its intersections, a considerable study was made of the possibility of grade separation of vehicular traffic ways so as to reduce traffic congestion at critical points.

Railway Grade Problems.—The problem of railway grade separation was pressed by numerous authorities. At the rate of $10,000 per fatality if paid by the railroads, they would be involved in a damage cost of $23,710,000 per year. To eliminate all crossings would involve an investment, the interest on which would exceed $1,000,000,000 a year. As a variant from grade separation, the problem of the use of traffic circles was widely considered. Manufacturers materially improved their snow removal devices so as to keep roads open during the winter. South Dakota made use of a magnet car to pick up nails, spikes, etc., from the roads.

Pedestrian Walks.—So as to reduce pedestrian accidents upon the highways and simultaneously benefit automobile traffic, the American Society for Municipal Improvements advocated the construction of sidewalks along public ways. Plans were developed by Philadelphia for an underground pedestrian concourse under and around its City Hall. The problem of pedestrian cross-walks at the center of blocks was given consideration and for the purpose of keeping children off the streets forty new playgrounds were created in Philadelphia. Many super-highways were discussed such as some in the vicinity of Cleveland, additional ones around Detroit, the so-called McCormick road toward the northwest of Chicago, and Sheridan Drive in Erie County, N. Y., while construction work on the west side elevated highway in New York City was actually started.

Traffic Signals.—Marked improvements were made in the construction and operation of traffic signal devices. Several arrangements were installed so that traffic regulation was more or less accurately varied with the demand. The devices included the use of contact areas, magnetic induction, sound signals, push buttons for pedestrians and selenium cells for shadow actuation. It was reported that fewer accidents happened at traffic controlled intersections in the cities of New York State. Neon light, fixed signs were placed on the market.

DRIVING RESPONSIBILITY

The model ordinance prepared under the sponsorship of then Secretary Hoover was adopted in a more or less modified form by several communities such as Indianapolis and many Wisconsin cities. New Jersey promulgated a motor vehicle financial responsibility law somewhat similar as that in other states which in effect is a compulsory automobile insurance ordinance. The Bureau of Standards and other organizations instituted psychological tests of drivers, operating under traffic conditions.

TRAFFIC REGULATIONS

Platoon System.—The progressive or platoon system of regulating traffic grew rapidly in favor and engineering and other detail studies were made and reported in the technical press with reference to the best methods of planning and installing this system. Several striking innovations were introduced such as a dummy of rubber representing a smiling woman, and another with skull and crossbones. In several cities traffic policemen were equipped with lights and with reflectors on front and back.

Installation Plans.—In Cincinnati the firemen were organized to assist in traffic regulation. New York City secured a report from some traffic and transportation engineer who recommended a billion dollar traffic plan. St. Paul voted an issue of $7,500,000 for street improvements. Massachusetts issued a state code with reference to traffic signal installation on the public highways, the first of its kind in the country. The Department of Labor continued the work started by then Secretary Hoover with reference to traffic ordinances, and appointed new committees to study the problems of protection of railway grade crossings and major highway intersections; the proper maintenance of motor vehicles; measures for the relief of traffic congestion. The report of the American Engineering Council Committee on street traffic signs, signals and markings was given wide distribution and study. Several city plan reports which included plans for main traffic streets were published during the year, including New Orleans.

Parking continued to become more acute, and numerous studies, recommendations and restrictive ordinances were brought into play. Many "parking hotels" and large garages were undertaken and several interesting schemes for parking machines were developed. The parked car was shown in Baltimore to be a menace to fire fighting. Minneapolis instituted a unique idea in the distribution of a tag with a map of the city and special directions for visiting motorists. Relief of down-town congestion was planned by the creation of outlying shopping centers in some cities and the provision that the outlying terminals of street railroads should be provided with ample parking facilities where motorists could leave their cars and proceed to the business district by street railway.

Lighting.—Improvement in traffic conditions was secured by additional street and highway lighting and the whole problem of street illumination was given technical and popular consideration. Riverside, Calif., and Peabody, Mass., for instance, installed extensive new equipment. In an endeavor to reduce traffic accidents due to distracting the attention of motorists, billboards and roadside signs were suppressed and their greater control advocated.

Conferences and Meetings.—The traffic problem was discussed at more or less length at numerous conferences and meetings of regular organizations and of special groups. A large amount of technical and safety literature was presented by various organizations in their special and general technical press. One such interesting study showed the possibilities with reference to the entire elimination of grade separation and of traffic control signals by the use of universal one-way thoroughfares. Aside from the innovations which were brought forth only additional study was given to the innumerable details which affect the traffic problem.

WATERWAYS AND HARBORS

BY PRESTON KING SHELDON

LIEUTENANT COMMANDER, N. Y. JUNIOR NAVAL MILITIA

EXPANSION AND DEVELOPMENT

Intra-coastal Canals. — Provision for future expansion of various rivers and harbors was acknowledged this year to be one of the major activities of the Federal Government. Nearly $100,000,000 is required annually for construction and maintenance programs to keep pace with the growing traffic of the principal natural and artificial water routes. Included in the projects contemplated are about 1000 miles of intra-coastal canals, in addition to 746 miles already finished. These will serve to provide water routes for those points that have not been favored with natural ones, and to become coördinating links between rivers, lakes and rail routes.

Transportation and Power Projects.—Maintenance and improvement operations are required for 930 rivers and harbors, and allotments of funds have been approved by Congress for carrying on investigations to carry out the provisions of the River and Harbor Act of 1927 aimed at the formulation of general plans for development of about 190 rivers throughout the United States as part of a connected transportation network. Included are provisions for a study of water power possibilities and problems of flood control. There are 140 harbors on the Great Lakes and, through them and their connecting channels, a total of 269,007,573 tons of cargo was transported last year. The value of this commerce was $4,331,663,125. The estimated savings of one season recently on bulk commodities through the Great Lakes ports was about $200,000,000. The craft plying through their waters vary in size from the modern canal motor ship of 1,000 to 2,000 tons capacity, to the lake steamers having as high as 13,000 tons aboard.

NEW YORK BARGE CANAL

Transport Conditions.—More than a 20 per cent increase in the tonnage of the New York State Barge Canal was indicated early in 1929, keeping well abreast of its gains for 1928. It includes the Erie, Champlain, Oswego, and Cayuga-Seneca canals. The system which is locked with ice in the winter was opened unusually early this year, which would probably have been an aid to commerce, but for flood conditions caused by rain. Few canal boats reached New York from Buffalo before May 6 and 7. Farmers suffered because of a grain tie-up in Buffalo elevators early in the season.

Larger and better cargo boats are being registered yearly for service on the Barge Canal. The total now approaches 800, while nearly 100 tow boats are also used. The aggregate tonnage of the barges and motor ships employed is better than 450,000. From 1918 to 1927 the cargo tonnage jumped annually, from 1,159,270 to 2,581,892. In 1928 the total was 3,089,998 tons. In 1928 the canal transported to New York City 30 per cent as much grain products as all New York State rail lines combined.

Traffic and Saving.—Incoming raw materials for one manufacturing plant were reported as the means of saving $3.40 a ton or $60,000 a year through the use of an all-water route. In general the savings in canal rates under all-rail rates is about 20 per cent, or an estimated average of $1 a net ton on all-canal cargo. It is estimated that about $50,000,000 is saved annually for the territory east of the Rocky Mountains by shippers and consumers whose merchandise travels entirely or in part on the New York Barge Canal system. In 1928 the amount of wheat transported was 33,000,000 bushels, which required only 500 barges. This was the largest aggregate grain shipment since 1894. To-day, although the barge canal was designed for craft bearing a maximum cargo of 1,000 tons, vessels carrying 1,500 to 2,000 tons can navigate it. An interesting feature to note in this connection is that a cargo of 2,000 tons, loaded on a modern motorized canal ship less than 300 feet long, would fill an average freight train a mile long moving 100 cars. According to present forecasts the total commerce passing through this canal is only about 25 per cent of the ultimate capacity. Agricultural products lead in tonnage, and manufactured products are second, gasoline shipments showing increases.

TRANSPORTATION RATES AND COSTS

Routes and Joint Service.—Transportation rates in general have been held in control by the combined effects of the activities of shipping over both the New York State Barge Canal system and the Mississippi River and its tributaries. Through water routes are already in use over many of the lanes provided by the Great Lakes and their connecting channels, the St. Lawrence River, the Barge Canal and Hudson River, and the Mississippi system. Joint rail-water or water-rail routes are operated in twenty-three states, and twelve others are in a position to use joint service by coastwise steamers. Within another two years the canals being provided to connect the Great Lakes with the Chicago, Des Plaines and Illinois Rivers will add the missing link in the country's inland waterway system, and will increase thereby the utility of the Panama Canal.

Monthly Toll Records.—Two high monthly records for tolls received from the latter were reported in 1929, the highest record being that of January, when the tolls were $2,502,815.12. The second highest month's record since the opening of the canal was registered in October, the returns being $2,485,936.86. For the fiscal year ending in June, 1929, the tolls were also the highest recorded in any one year, being $27,127,376.91 for 6,413 commercial vessels and $1,512.39 for 167 launches. Although a larger number of commercial vessels used the canal in the previous year the tolls were lower, being $26,944,499.77. A tonnage of 30,000,000 was moved in 1928.

TRADE ROUTES

Panama Canal.—In the short span of twelve years the Panama Canal reached about half its ultimate capacity. In about 30 years it is believed that the full capacity will have been reached. Joint action was taken just prior to the adjournment of the Seventieth Congress, authorizing a survey of the possibilities of enlarging it and also further consideration of a route established on paper across Nicaragua for another canal which if built is expected to save from one to two days sailing time between the ports of both the United States and Canada.

Ohio River.—In company with the completion and initial use of the fifty new locks and dams of of the Ohio River canals this year, opening an all-year-route of 1,000 miles between Pittsburgh and Cairo, all the important waterways and harbors of the United States have been demonstrating by actual traffic movements the fundamental value of the natural trade routes of the North American continent. Value also attaches itself to harbor commerce in Canada, which may be laid mainly to the fact that the elemental value of sea ports as natural outlets to railway traffic demands an acknowledgment of their utility.

Vancouver.—Close observers of Canadian freight traffic have noted a distinct tendency for western Canadian produce to move out by way of Vancouver, at which port the number of regular steamships operating as a result of the opening of the Panama Canal have been as high as forty-six, a considerable increase. Imports as well as exports have grown through this port. Certain goods consigned to points in the United States are gradually finding their way through Vancouver. Imports through there were coming this year from thirty-five countries for distribution in both the United States and Canada. Vancouver's position now rivals that of Montreal which is expected by some to be surpassed in tonnage, although this is not to be taken to mean that the success of Vancouver will be at the expense of Montreal to any great extent.

Inland Barge Routes.—Within the past four years the inland waterways of the United States have ceased to be looked upon as disconnected segments, because of the large and regular appropriations made by Congress for their development, and also because of the experiment conducted by the Federal Government up and down the Mississippi river in the operations of the Inland Waterways corporation which has barge lines running over a route of about 2,550 miles, extending from the Twin Cities of Minnesota, to New Orleans, through the Mississippi, and in Mobile Bay to Mobile, and from there to Birmingport, near Birmingham on the Warrior River.

Terminal facilities are afforded by municipal ownership at Minneapolis, St. Paul, Dubuque, Burlington. St. Louis, East St. Louis, Memphis, Helena, Baton Rouge, Tuscaloosa, and New Orleans. The Inland Waterways corporation owns its own terminal facilities at Cairo, Vicksburg, and Birmingport. At Mobile the terminal facilities are both city and state owned. Inland barge routes have aided trade greatly.

POSSIBILITIES OF WATER TRANSPORTATION

Joint Rail and Water Rates.—Public attention has but lately become concentrated upon the possibilities of water transportation to a greater degree than ever before recorded. One of the chief benefits derived as a result of the government experiments with the Inland Waterways corporation has been the effecting of joint river and rail rates, which has been creating closer relationships in transportation problems met not onlv by railway officials but as well by operators of motor truck fleets. As feeders barges have proven of great value in aiding in the increase of the volume of business of railroads and trucking companies. In the Mississippi Valley another result has been the bringing forward of the potential manufacturing facilities of the cities along the routes used by river craft because of the accessibility of raw materials which constitute the bulk of cargo handled in general by boats.

Inland Waterway Revenue.—As an example of the possibilities of revenue in the operation of modern water transportation equipment, the Inland Waterways corporation reported this year for 1928 a net income of nearly $374,000 after less than five years of activity, in comparison with the annual average loss of $1,000,000 by its predecessor.

Mississippi-Ohio System.—Nearly $3,000,000 a year is being saved on the Mississippi-Warrior systems to shippers of beauxite ore, sugar, grain, cotton and miscellaneous cargoes. Private capital is expected soon to be invested in modern barges and towboats on this route, because of the success thus far achieved by the Government by way of example. The original purpose of the law covering the Inland Waterways corporation is not to continue government operation in this manner longer than necessary to advance the ends for which organized. As soon as the situation has reached a point where the system already in the hands of the Government can be transferred to private control, to the best advantage, that purpose will have been accomplished. One other common carrier has already begun operations on the Ohio and lower Mississippi, with two others projected. All year round navigation between Pittsburgh, Cairo, and New Orleans, made possible by the dedication in October of the improvements to the Ohio River, is one of the chief incentives contributed this year toward multiplying interest in waterway traffic, not only on this route but elsewhere.

Canals as Connecting Links.—Canals, having proven their worth as connecting links, are also lending themselves to good purpose in such projects as that of the Ohio River, in removing shallows from streams that might otherwise be useless for navigation. Along the Atlantic seaboard, from New England to Miami, across Florida, to Corpus Christi, Texas, canals are to form a most important adjunct to the present modes of transportation, according to plans completed or under discussion by government officials. Already the first of six links to connect the North Atlantic Seaboard with the South, which terminates at Beaufort, handles 700,000 tons a year, of cargo valued at nearly $30,000,000. In New England, the canal across Cape Cod, now under government control, is to have provision made for two way traffic, by widening. Its commerce has not met expectations because of inadequate depth.

New York-New England Coast Traffic.—Some 2,000,000 tons of cargo pass by water along the coast, from the Port of New York, to New England ports, two-thirds of which traffic originates at New York, the balance representing an interchange between railroads and coastwise steamships. The New England ports, in return ship by water as much or more than they receive. Cotton, wool, hides and metals form the main cargoes from New York to New England.

Port of New York.—Jealous eyes have been focussed on the Port of New York, because of its leading position as a port of entry and export, and a continual fight is on in an effort to obtain freight differentials from interior shipping points to other ports, to wrest away the advantage

New York has maintained all along for export shipping. In the latter field this port has been holding its established lead while increasing the tonnage of its imports. Exports have increased in certain other ports, particularly on the Pacific coast, but not in any substantial way as the result of taking this traffic from New York. Any of the recent increases through these ports have rather been those attributable to natural causes.

TEXAS PORT DEVELOPMENTS

Traffic Facilities.—In round figures nearly 45,000,000 tons pass yearly through the ports of Texas, having a value above $1,600,000. A tendency for large ships is seen by those desirous of paving the way for future growth for the Gulf Ports, a fact that has made itself of paramount significance also at New York, Chicago and elsewhere, so that piers having from 1,000 to 1,100 feet are already felt necessary to furnish berthing accommodations for the large ocean liners now a reality. In a report issued for Texas, a saving of $100,000,000 has been claimed for the shippers using the ports of that State.

Texas City, which is on the west side of Galveston Bay, about 7½ miles northwest of the City of Galveston, is a port for petroleum products, also sulphur, grain and sugar. Its annual tonnage has jumped from around 300,000 in 1917, and now fluctuates around the figure of 4,000,000.

Corpus Christi, since its entry into general foreign and domestic trade, late in 1924, has made exceptional strides. The commerce there has already reached over 3,500,000 tons yearly, and its cargoes include petroleum, raw cotton and lead.

Houston in ten years has increased its tonnage on an average well above 1,000,000. In addition to petroleum products, iron and steel manufactures have been the chief commodities. In 1928 the total was 12,981,113.

Galveston, which has a depth of 35 feet in its harbor, averaged 5,400,000 tons a year from 1917 to 1926. It leads in cotton and numbers among its items wheat, in which it was the leader in 1926.

OTHER PORT DEVELOPMENTS

Camden, N. J.—Another recent contender for gains in waterborne commerce is Camden, N. J., which has been aided by the south Jersey Port Commission and claims an annual saving of $100,000 for shippers and users. It has established a set policy of operating publicly owned and publicly operated piers for the benefit of all on equal terms. It is rapidly becoming a lumber center, handling nearly 25,000,000 feet yearly. It also has been of great aid to South Jersey farmers in the matter of lowering costs on fertilizer. Progress has been made in improvements over a front of 150 miles on the water from Trenton to Cape May. Three ship lines make regular calls at Camden. Since 1925, when only thirteen ship arrivals were reported, Camden has now about one hundred and fifty calls a year. Its first municipal pier was brought into use in 1925.

Richmond, Calif., celebrated its twenty-fourth anniversary in August, as an incorporated city, and has become established as one of the young ports in the San Francisco Bay area.

Seattle has a group of eight modern terminals provided with modern transit sheds and rail head facilities, supplemented by tractors, trailers, portable and fixed elevators, cold and dry storage.

Portland, Ore., early in 1929, completed construction of a new harbor wall providing new boat landings for river craft and freight elevators.

Hudson River.—Among other progressive steps made the past year has been the bringing to completion of about half of the final project in the Hudson River, designed to make Albany a port of entry by maintaining a channel having a depth of 27 feet to Albany, and 12 feet from there to Waterford.

WATER SUPPLY

By H. Burdett Cleveland

Consulting Sanitary Engineer, New York

FINANCIAL ORGANIZATION

Holding Companies.—The purchase of privately owned public water supply systems by large holding companies has continued throughout the year. Some of these holding corporations have been taken over by financial and banking interests. This development, commencing about four years ago, does not materially affect the municipally owned water supply field, since, in most states, from 70% to 90% of the systems are publicly owned and a change of ownership of a system from municipal to private is a rare occurrence. Continued discussions extolling private ownership have appeared. Some of the arguments advanced require interpretation in the light of the motive apparently actuating the discussion.

Accounting.—The American Water Works Association at its annual meeting established a new division to be known as the Division of Water Works Accounting and Finance. This neglected phase of water supply management requires just such an impetus to bring about needed economies and more efficient service.

OPERATION

Current Practice.—An unusual amount of valuable data describing comparative practice has been collected during the year and published in the technical press, covering, among other subjects, water meter rates in many municipalities, water consumption, ownership of meters, regulations for taps and services and friction losses in service connections.

Reforestation.—Reforestation of municipal watersheds is going on at an increasing rate. The first city in New York State, Little Falls, to begin cutting, it is stated, is receiving an annual income of over $12,000 from something over 1000 acres reforested.

Cross-Connections between Potable and Polluted Supplies.—The report and recommendations of the Committee of the New England Water Works Association, finally submitted in April after lengthy discussion, was not so rigorous as the required practice set up by regulations recently adopted by several states, notably New York and New Jersey, in the matter of cross-connections between polluted fire and industrial supplies, and public water supply systems. However, indications point to the complete safeguarding, eventually, of public water supplies from this menace through practical but effective means.

Distribution Problems.—Renewed study is being given to the comparative economy and serviceability of various kinds and types of pipe, especially for conduits, since relative sizes are increasing with the greater demands involved, as, for example, in connection with the Wanaque Aqueduct in Northern New Jersey. Closer attention has been centered, also during the year, on types and methods of construction of joints to prevent leakage.

Allocation of Sources.—Increased consideration is being given by state governments to the apportionment of available sources of water supply to the municipalities affected through the jurisdiction of State Conservation and Water Control Commissions. The New Jersey Water Policy Commission has recently appointed five engineers to make surveys and report to the 1930 legislature on New Jersey's next major water supply development. For the first time, the problem of allocation of water supply sources has reached the Federal courts. New Jersey has asked for the appointment of a special master to hear its objections to the proposed diversion of Delaware river water by New York City. Pennsylvania, recently, applied for permission to join in this action. Connecticut has pending an action in the Federal courts to enjoin the Metropolitan District Water Supply Commission (Boston) from diverting water from the Swift and Ware rivers in Massachusetts, tributary through the Chicopee river to the Connecticut river.

CONSTRUCTION

Completed Projects.—Several large water supply projects have been completed during the year or are nearing completion, some of such major projects being the Howard Bend plant on the Missouri river for St. Louis, consisting of filtration works and pumping station, the Mokelumne project in California for the East Bay Municipal Utility District serving Oakland and eight other cities, the Basic Creek dam and tunnel forming a part of the new Albany water works, and a 20,000,000 gallon clear water reservoir at the Detroit filtration plant.

Projects under Construction. — Other major projects being carried out are the San Gabriel dam for Los Angeles, the seventeen-foot, twenty-mile tunnel from the Hill View reservoir of the New York system to Brooklyn, the Wachusett-Coldbrook tunnel of the Metropolitan (Boston) District Water Supply Commission, the Hetch Hetchy project for San Francisco, and the Wanaque Aqueduct in Northern New Jersey.

New Projects.—Eleven cities in southern California, including Pasadena, have started study of a project to tap Boulder Dam Reservoir and construct a 250-mile aqueduct. Seattle, Detroit, and New Haven are planning extensive water supply additions.

WATER SUPPLY TREATMENT

Methods.—No radical change in the principles or design of water filtration plants has developed during the year, as has been more or less true for the past twenty years. A sustained preference for gravity mechanical or rapid sand filters over slow sand filters and pressure mechanical filters is indicated in the new purification designs, as has also been true for several years. In fact, water filtration practice has been developed to a much more satisfactory state of effectiveness and of maximum economy than processes in other sanitary engineering branches.

Experimental Work.— At Detroit, Baltimore, and Cleveland considerable experimental work has been under way to determine possible improvement in filter plant operation through variation in wash-water rates. Further reports of the success met in reducing carbonate hardness by lime softening at the Columbus and several other Ohio filtration plants were made. At several large filtration plants the newly adopted practice of employing mechanical clarifiers for presettling turbid water is noted. Preammoniation to prevent chloro-taste, and prechlorination to effect economies in the use of coagulants and increase the effectiveness of sterilization have been adopted at additional plants. Research work at the Chicago experimental plant is under way, and at Ottawa a research filtration plant has been constructed.

TYPHOID FEVER REDUCTION

Dr. James A. Tobey has pointed out, from government records and from the report of the American Medical Association for 1928, that water purification and other applications of sanitary science have reduced typhoid fever death rates in 74 cities of more than 100,000 population over 90% in twenty years. In 1910 the mortality rate in these 74 cities was 20.58 per 100,000, while in 1928 it was but 1.89.

ELECTRIC LIGHTING AND POWER

By G. F. Wittig

Statistical Editor, *Electrical World*

GENERAL PROGRESS

Operating Systems.—The group of activities usually designated as the electric light and power industry comprises about 4,000 operating systems. In size they differ widely; at one extreme are those each serving but a single diminutive hamlet, at the other, those of almost state-wide extent. According to the Census for 1927, which reports 4,355 establishments in all, nearly half (2,004) operated no generating plants but purchased all their energy. These are necessarily much smaller on the average than those that have their own plants. In the succeeding two years the ratios have not notably changed, though the numbers in each class are decreasing by a process of corporate consolidation and absorptions, a natural concomitant of technical and economic progress. Transmission line extensions bring in towns formerly supplied from local plants, and enable other communities to have service for the first time; local distributing systems, both privately and municipally owned, are absorbed into the power systems from which they receive their energy, and thus cease to exist as separate entities. This process is not new; it continued during 1929.

Ownership.—Classified as to ownership, most of the industry is conducted by commercial corporations; municipally owned systems constitute 4 or 5 per cent as to value of plant, energy sales and revenue, but serve 10 per cent of the customers. Numerically they rise to half the total: the 1927 Census reports 2,198.

Growth of Industry.—The recent rate of growth of the industry is indicated in the accompanying tables; for comparison, data on earlier years also are presented. For the quinquennial intervals the figures are from the United States Census; those for 1928 and 1929 are taken from the *Electrical World.* Credit is also due to the latter publication for other material used in this article. Statistics for 1929 are in part estimated, data for the last two months being incomplete.

STATISTICAL SUMMARY

Operating Revenue. — The year marked the semi-centennial of the invention of the incandescent lamp. As the statistics show, it also marks the attainment, by the industry founded on the use of that device, of an annual operating revenue for the first time surpassing $2,000,000,000. Amounting to $2,107,000,000, it exceeded the earnings for 1928, computed to be $1,941,955,000, by 8.5 per cent and overshot the revenue for 1927 as revealed by the recently published Government Census returns for that year by nearly $305,000,000.

Energy Output.—Meanwhile the energy output rose to 92,737,000,000 kw.-hr., almost 10,000,000,000 kw.-hr. more than in the preceding year. If to this is added the output from other public utilities generating electrical energy, chiefly railways that produce their own power, the total comes to 97,703,000,000 kw.-hr. as the year's aggregate for all electrical public utility plants in the United States.

Customers.—Of the 24,257,159 customers more than four-fifths, 19,721,486, are residential, which means that 70 per cent of our homes now have electric service. The increase in this group during the year was 887,516. In addition the number of commercial lighting customers grew by 126,495 and of new users of central station energy for power and miscellaneous purposes by 58,367. In all, there were somewhat over a million more at the end than at the beginning of the year.

Plant Capacity and Investment.—To perform the required service called for the use of 29,550,000 kw. of plant capacity and involved an investment of $11,100,000,000. Aside from the output of hydro-electric plants, which constituted 36.4 per cent of the total, there was required for the generating of the central-station electrical energy a consumption of 41,794,000 tons of coal, 9,477,000 bbl. of fuel oil and 112,672,000,000 cu. ft. of natural gas.

GROWTH OF THE ELECTRIC LIGHT AND POWER INDUSTRY IN THE UNITED STATES.*

Year	Generator Rating (Thousands of Kw.)	Energy Generated (Millions Kw.-hr.)	Revenue for Electric Service (Millions Dollars)	Customers (Thousands)
1907	2,709	5,862	170	1,947
1912	5,165	11,569	287	3,838
1917	8,994	25,438	502	7,179
1922	14,313	43,560	1,020	12,710
1927	25,811	74,686	1,803	21,790
1928	27,698	82,927	1,942	23,220
1929	29,550	92,737	2,107	24,257

* Sources: 1907-1927, Census; 1928, 1929 (partly estimated), *Electrical World.*

Energy Consumption.—In line with the marked upward movement in the various industries and in response also to the more liberal use of electricity in the home the energy output rose 12 per cent over that of 1928. In one month the excess was 17 per cent. That the ratio for revenue was decidedly smaller may be ascribed to two influences. One of them is the gradually decreasing average residential rate, and, probably in smaller degree, in the rate for large power. The other is the relatively more rapid growth of wholesale energy sales, which constitute an ever larger portion of the total output. At one time most of the energy sold was used for lighting; at present about two-thirds of it is for commercial power.

CONSOLIDATIONS

Development.—The grouping of power systems is not a new phenomenon. It has been going on for many years. It began as long ago as the nineties of the last century, when the introduction of alternating current extended transmission distances beyond the half-mile or mile of the early installations, and made possible the linking of adjacent properties. More recently this movement has assumed large proportions, and has followed two distinct paths. One was the formation of a holding company that would own properties in different territories so as to get diversity and stability. The second was to develop comparatively large properties in each area to take full advantage of the economic possibilities of supplying a diversified load area by means of hydro and steam stations of sufficient size to be economical. During 1929 these two trends continued.

Company Acquisitions.—In the operating holding company group the Associated Gas & Electric Company is typical of the company that buys properties in all parts of the country to get diversity in holdings and stability in earnings. Most of the properties are small that remain available on the market and there is little doubt that this type of expansion or acquisition will decrease in magnitude. In each region, however, existing holding company subsidiaries purchased local properties. Active in this direction were the Insull interests in Maine, the International Hydro-Electric System in Massachusetts, New Hampshire and Rhode Island, the Associated Gas & Electric Company in New York, the Georgia Power Company in Georgia, the Southern Public Utilities Company in North Carolina, the Interstate Public Service Company in Indiana, the Wisconsin Power & Light Company in Wisconsin, the Tennessee Central Service Company in Tennessee and several companies in Nebraska, Oklahoma and Texas. The properties added were small town and municipal plants.

Adjustments.—In the operating holding company type of organization there was an active year of readjustment and consolidation. One of the large groupings was the formation of the Commonwealth & Southern Corporation that brought three strong holding companies together. Another was the merging of the Barstow interests with those of the Associated Gas & Electric Company, and a third the formation of the Niagara & Hudson Power Corporation. These consolidations were formed largely under banker auspices and were economic steps to get stability in earnings and economics in financing.

New Investment Companies.—Very few new operating holding companies were formed, but several of the investment type were active. Most of these buy minority stock interests in operating and holding company groups and are largely financial only. Eventually some of them may be the agency under which several holding companies are merged, but at present, and especially since the market crash, they are interested chiefly in security buying and selling. Typical units in this group are Insull Utility Investments, Inc., United Corporation, United States Electric Power Corporation and Electric Shareholdings Corporation.

NEW CONSTRUCTION

Preponderance of Steam.—New construction reported amounts to 3,031,510 kva., by far the larger portion being in steam. While about a third of the energy output during the year came from water power, the hydro plants completed or scheduled for completion made up less than 11 per cent of the new capacity. Some of this new construction was, of course, in the nature of replacements; the net gain is smaller. The heavy preponderance of steam, in future building, seems likely to continue: First, the demands for additional power are greatest in the sections of the country where the existing water-power sites either have in the main been developed, though fairly abundant, as in the Middle Atlantic and East North Central States, or where there is very little water-power to begin with, as in the Southwest; second, the extremely low stream-flow during the summer and fall of 1929 gave emphatic warning against the danger inherent in a lack of abundant steam-power reserve. Two important cities dependent solely on municipal water-power plants suffered a "power famine" resulting in a call on the National Government for the temporary use of a naval vessel to serve as a traveling power plant. Private systems in other parts of the country were obliged to increase greatly the output of their steam plants or to import energy from neighboring systems to meet the deficiency in hydro power. In September the output of fuel-burning plants was 24 per cent greater than it was a year before.

New Steam Plants.—A number of notable steam plants were completed in 1929, among which the following figure conspicuously for size: State Line (Indiana), Deepwater (Delaware), Louisiana Power & Light station, River Bend (North Carolina), Delray No. 3 (Michigan), Gorgas No. 2 (Alabama), and Holland (New Jersey). These seven plants total 837,500 kw. To be completed in 1930 or later are such plants as Ashtabula (Ohio), Atkinson (Georgia), White River (Indiana), Michigan City (Indiana), James H. Reed (Pennsylvania), Sayreville and South Amboy (New Jersey). These seven plants will have a total initial capacity of 538,000 kw. Large additions have also been made to such well-known stations as South Meadow, Hudson Avenue, Chas. R. Huntley, East River, Hell Gate, Avon, Crawford Avenue, Milwaukee, Philo, Cahokia, Deepwater (Texas), Station A (Pacific Gas & Electric), Long Beach No. 3 and Powerton. Of these the State Line plant is conspicuous for the huge rating of its first unit—208,000 kw.—and for the proposed ultimate capacity, which is to be at least 1,000,000 kw.

Waterpower Plant Construction.—The largest new waterpower plant reported for the year, at Calderwood, Tenn., is rated at 112,000 hp. No others of notable size were completed during the year, but at least 18 such plants with an initial rating of 50,000 hp. or larger are under construction and scheduled for completion in 1930 or shortly thereafter. Of these, seven range from 100,000 hp. to 185,000, namely, Connecticut River, two near Columbia (S. C.) totaling 275,000 hp., Bagnell (Mo.), Ffteen-Mile Falls, Skagit River, and Table Rock (Mo.),

Capital Expenditures.—A survey made by the *Electrical World* shortly before the close of the year of probable capital expenditures for new construction, as distinguished from maintenance of existing plant, indicates that during 1930 about $913,000,000 will be spent, according to then existing prospects. The amount is greater than corresponding expenditures during 1929 by 5 per cent.

LEGISLATIVE AND LEGAL DEVELOPMENTS

Federal Trade Commission Inquiry.—Utility companies in general and light and power companies in particular were targets for national, state and local inquests of various kinds and with various objects. The most important and far-reaching of the inquiries, that conducted by the Federal Trade Commission at the behest of the United States Senate, opened the year in a condition of virtual blockade and closed it in the same state of partial frustration. This was due to the court proceedings resorted to by the Electric Bond & Share Company to prevent the commission from seizing records which the commission asserted to have and the company asserted not to have a bearing on the matters upon which light is being sought. The points raised still await final judicial determination; other companies are disposed to await the outcome before complying with all the commission's requisitions, and the magnitude of the undertaking and limitation of personnel have aggravated the leaden feet of procedure. The propaganda phase of the hearings came to a close in the fall, after various bygone publicity and political activities of power companies on the Pacific Coast and elsewhere had been canvassed in the same manner as in 1928.

State legislative investigations included one by Massachusetts covering, on general lines, the utilities of that state, and one by New York into the laws governing the State Public Service Commission and proposed ways by which they can be improved. Both of these investigations are at the time of writing incomplete, though recommendations based upon them are due at the legislative sessions that open in January, 1930. Of the two, the New York inquiry has been the more fertile, and it may bring about a changed regulatory law. A special committee of the Wisconsin Legislature investigated the water-power law of that state. It recommended by a majority of one a state ownership amendment to the constitution. Pennsylvania's Legislature defeated a resolution to investigate the Keystone State's commission. An inquiry, still incomplete, by the New York Public Service Commission into submetering in New York City attracted attention in other large communities where a similar problem exists, and some valuation proceedings before the commissions of Massachusetts, California, Oregon, Alabama, Georgia and other states had an interest beyond territorial boundaries because of the issues involved.

Federal Power Commission Projects.—Meanwhile the Federal Power Commission has up for consideration several projects that are the source of considerable controversy; disposition of none of them has yet been made. One is the Cumberland Falls project in Kentucky, over which scenery conservationists and utilitarians have locked horns; the second, the Potomac River project, where the same condition obtains; the third, the Flathead Lake project on an Indian reservation in Montana, where a scheme to manufacture fertilizer has resulted in a deadlock, the Montana Power Company and an individual friend of agriculture being the contestants.

TECHNICAL PROGRESS

No technical innovations of general interest were introduced; progress has consisted rather in a continuation of former trends. The extraordinary size of the new unit at the State Line plant in Indiana has been mentioned; several huge machines, rated at 160,000 kw. each, were brought into operation in the New York metropolitan district. Greater efficiency in the use of fuel continues to be achieved, the average consumption for all steam-operated public utility plants in the United States—3.2 lbs. of coal per kw.-hr. as recently as 1919—having fallen to 1.76 lbs. in 1928 and, further, to 1.66 lbs. in 1929. Interconnections made it possible to improve economy of operations and, to help out regions in districts because of deficient water power by steam-generated energy from adjacent territory, in some instances in another state. In the field of lighting a noteworthy feature is the increase in the use of neon lamps chiefly for advertising purposes where their color is of particular value.

COGNATE SOCIETIES

American Water Works Assn., 29 West 39th Street, New York City, New York.

International Association of Fire Chiefs, Fire Headquarters, Race St., Philadelphia, Pa.

National Parks Association, 1512 H St., N. W., Washington, D. C.

National Public Service Association, 87 Nassau Street, New York, N. Y.

Parks and Playgrounds Association of New York, 1123 Broadway, New York, N. Y.

DIVISION IX

DEFENSE AND ARMAMENTS

MILITARY PROBLEMS OF THE UNITED STATES

By William Addleman Ganoe

Major, U. S. A.; Historical Section, Army War College

WAR DEPARTMENT AND ARMY ACTIVITIES

Duties and Functions.—The War Department and the Army of the United States cover a wide field of varied activities. Exterior to the main problem of proper defense for the country, the officers of the military establishment are charged with the supervision of rivers and harbors, flood control, inland waterways, Panama Canal and insular affairs.

The insular possessions of the United States at present subject to the jurisdiction of the War Department, are those known, respectively, as the Philippine Islands and Porto Rico. These two groups include by far the most important insular possessions of the United States, as viewed from the several standpoints of number of individual islands, area, population and natural resources—developed and potential. Consideration by Congress of the question of tariff readjustment has been made the occasion for the presentation, in hearings before committees of the Senate and House of Representatives, in the public press and elsewhere of proposals to the effect that the products of the insular possessions should, upon entry into the United States, be subject, either generally or in the case of certain specific products, to the same import duties as are applicable to similar products of foreign countries. These proposals have been most frequently made with reference to the Philippine Islands, but have also been extended, at times, to include Porto Rico. The particular product that has featured most prominently in the recent discussion of proposals to levy tariff against imports from the Philippine Islands and Porto Rico is sugar.

Mississippi Flood Control.—In our own country, the problem of the Mississippi flood control has been an intricate one for the Corps of Engineers. Since last year's issue of The American Year Book, the special board authorized by the act of May 15, 1928, has submitted to the President its report with reference to the engineering differences between the adopted project and the plan recommended by the Mississippi River Commission. The board recommended the adopted project. The President approved the policy and method of dealing with the problem set out in the report of the board dated August 8, 1928. An opinion has been rendered by the Attorney General, that the project set forth in House Document No. 90, Seventieth Congress, first session, is the legal project to be executed in accordance with the law, that this project is fixed, and not subject to review or change by executive action. The Flood Control Act of 1928 adopted a project for the flood control of the Mississippi in its alluvial valley and for the improvement of the river from the Head of the Passes to Cape Girardeau, Mo. This work is to be prosecuted by the Mississippi River Commission under the direction of the Secretary of War and the supervision of the Chief of Engineers. The act authorized the appropriation of $325,000,000. It also contained provision for the appropriation of $5,000,000 as an emergency fund, to be allotted by the Secretary of War on the recommendation of the

Chief of Engineers, for rescue work, or for the repair or maintenance of any flood control work on tributaries of the Mississippi River threatened or destroyed by flood, including the flood of 1927. The same act modified the project for the control of floods on the Sacramento River, Calif., in accordance with the report of the California Débris Commission submitted during the first session of the Sixty-ninth Congress. These modifications provide that the total amounts contributed by the Federal Government, including amounts heretofore contributed, shall in no event exceed in the aggregate $17,600,000. Pending approval of the report of the special board, funds appropriated in 1928 ($24,000,000) were expended for levee, revetment, dredging, and survey purposes along the stem of the Mississippi. This resulted in improvement of flood-control structures. In the spring of 1929 the largest flood that has ever passed down the Mississippi River without serious crevasses was held between the main river levees without any disastrous breaks. In addition, numerous emergency repairs were made during the year on tributary works that had been destroyed by floods. The funds appropriated for flood control for the fiscal year 1930 ($30,000,000) have been scheduled for expenditure under the adopted project for levees, revetments, dredging, spillway, and other incidental works. The proposed work on the main river levees includes substantial enlargements and raisings at places between Cape Girardeau and New Orleans. These works, as well as revetment works, were well started at the beginning of the low-water season. Contracts for the Bonnet Carre Spillway, above New Orleans, and the guide levees pertaining thereto, are being made, and the work will be prosecuted as rapidly as possible.

AIR CORPS

The Air Corps has been considerably handicapped in its future development. Operations during the past year have been seriously curtailed by lack of airplanes and the poor condition of hangars and other essential equipment necessary for the proper maintenance and protection of airplanes. The primary objective of the Air Corps in time of peace is to be ready for immediate and efficient operation in time of emergency. Tactical units must practice in time of peace the functions that they will be required to carry out at the outbreak of war. It is essential that tactical units be equipped with the airplanes called for by their Tables of Organization, so that they may be properly trained and for the most important reason that there is no reserve on hand for military airplanes which can be immediately assigned to tactical units. The 1800-airplane program did not provide for advanced training airplanes, which have had to be withdrawn from tactical units, nor for the large percentage of airplanes out of commission at stations and at air depots. This shortage, coupled with the original inadequate allowance of airplanes to tactical units called for by the old Tables of Organization and the incorrect estimate of the training facilities required to carry out the 5-year program, leaves tactical units very short of airplanes.

WAR SUPPLIES

Reserve.—A large number of items essential to successful military operations cannot be obtained during the early months of warfare either from commercial stocks or by production. The most advanced procurement planning cannot assure the immediate production in quantity of special and technical articles peculiar to a state of war. The necessary supply of these articles, without which success and safety will be imperiled, must be drawn, if at all, from reserve stocks accumulated and maintained by the Government. The past 10 years has witnessed a rapid decrease in these stocks accumulated at the time of the armistice, and this decrease still continues due to deterioration and budgetary limitations. The stocks at present on hand are unbalanced and show many important deficits as measured by such estimates of probable need as are available.

At the close of the World War this country had on hand large stocks of war supplies and equipment. In the interests of economy, free issues of equipment were made to all components of the Army during the years immediately following the war, thus reducing the appropriations required for the maintenance of the Army. Large quantities were also disposed of by sale, thus reducing the storage-space costs. The money from these sales was turned into the Treasury. It was soon realized that if the above policies were continued it would be only a few years before these stocks would disappear. The country would then be in the same situation that it was at the beginning of the war, with no reserve of supply and equipment on hand for an emergency. As a result of studies made in 1921, tentative figures were set up for a war reserve for three field armies or 1,500,000 men below which, it was felt, free issues should not be made.

Raw Materials.—Allied with this problem is that of producing in time of war those raw materials wherein domestic production falls short. If in an emergency these strategic materials are not forthcoming, privation to the country must follow. In order to alleviate or repair such a condition, constant studies of our domestic resources are being made so as to stimulate production in time of emergency, or cause substitutes to be made.

The Supply System.—The World War brought a realization of immense and involved difficulties in the procurement of supplies for a nation at arms, but left no perfect model as a guide to future planning. In these post-bellum years it has been necessary to build from the beginning a system and method of procedure for procurement. The problem of the War Department now under consideration in connection with "planning for emergency procurement" is to be sure that our organization is such that it will be capable of rapid expansion in case of need and when expanded will be in organization and otherwise best adapted to handle the great volume of work expected in an emergency.

ARMY PERSONNEL

Housing Problem. — Considerable progress was made in the completion of permanent barracks, quarters, hospitals, and other buildings required for the proper housing of the Army, under plans formulated by the War Department and approved by Congress which provided certain funds therefor, under programs distributed among several fiscal years. The practical completion of the program for 1927 has provided 406 hospital beds and accommodations for 8190 enlisted men, 83 non-commissioned officers' families, and 18 officers' families; the completion of the 1928 program will have provided 487 additional hospital beds, permanent housing accommodations for 5193 enlisted men, 14 non-commissioned officers' families, and 93 officers' families; while the projects started or completed under the 1929 program will, when wholly completed, afford 419 additional hospital beds and permanent housing accommodations for 3947 more enlisted men, 20 officers' families, 50 non-commissioned officers' families and 151 nurses. Other projects the 1929 program are under way.

Uniforms.—The program of the Chief of the Militia Bureau for the procurement of the roll-collar type of woolen uniforms for the National Guard, as announced last year, has been carried to completion. The uniforms are now being issued, and during the ensuing year the National Guard will be furnished at least one uniform of this type per man. The marginal requirements will be accumulated during subsequent years.

ORGANIZED RESERVES

While the Regular Army and the National Guard have a distinct function both in peace and war, the Organized Reserves are not so situated. Theirs is an organization wholly organized and trained for an emergency. The essential peacetime need of the Organized Reserves is, therefore, unit training. It is highly desirable, if not essential, in training Reserve Officers for their duties as leaders of units in time of emergency, that they be given actual practice and experience in the command of men. With all of its other duties, especially during the summer months, the Regular Army is too small to offer Reserve Officers opportunity for such command. This year specially selected and qualified Reserve regiments and similar units will be allowed to conduct the instruction of Citizens' Military Training Corps students. The plan will be given a trial in at least one camp in each of the nine corps areas whose commanders have been directed to make full reports as to the merits and demerits of the plan. Decision will then be made as to the continuance or extension of this form of training.

ENLISTMENT AND PROMOTION PROBLEMS

The Air Corps was increased, effective Dec. 5, by 536 men. This increment was drawn from all other branches of the Army except the Signal Corps and the Finance and the Medical Departments. This was a part of the second increment under the 5-year Air Corps program. An increase of 1960 men in the Air Corps to complete the second increment (and provide the third increment) is being obtained by decreasing all other branches of the Army except the Coast Artillery Corps, Quartermaster Corps, Signal Corps, and Medical and Finance Departments. Such a method means the further decrease of ground units in order to build up the Air Corps. The available strength of Regular Army for immediate service within the continental limits of the United States was, on June 30, 1929, 89,453.

Officer Promotion.—Probably the most pressing and depressing problem confronting the service is that of the proper promotion of officers. About 6000 captains and lieutenants came into the service at the close of the war, approximately at the same time. The usual spread of years that operates ordinarily for a steady flow of advancement is largely denied them. The consequence is that there is little hope of many of them reaching the grade of colonel or lieutenant colonel. Their plight has been aggravated all the more by the reduction of the Army in 1922. Many, irrespective of their valued and efficient services, have no hope of a proper future. It is only because of their belief that Congress will soon alleviate this condition that many of them remain in the Army. A delay in its settlement, on the other hand, will doubtless cause many resignations and a consequent loss of morale in our combatant forces. Probably nowhere in the Army are there men more adversely affected by this so-called World War hump than in the Air Corps. Junior officers are performing duty out of proportion to their rank.

Training.—The primary purpose of the Army is to be in readiness for immediate operation. To accomplish such a result, the Regular Army and National Guard should be immediately available to organize for field service, and the state of their training should be such as to promise success in any probable combat mission. In the World War the average American soldier who participated in a major engagement received eight months of training before he entered a quiet sector. For those who entered combat, the training period averaged ten to eleven months. In future, it will be the exception for our Army to have allies to hold the line while such lengthy training is going on.

MECHANIZATION PROBLEMS

We are living in a machine age, and, in the interest of national defense, the Army must act accordingly. In the commercial world the machine has largely replaced man power; so, the Army must, to the fullest practicable degree, use machines in place of man power in order that our man power can occupy and hold ground without terrific losses incident to modern fire power. Our country, of all the world, is best able to take advantage of machines. Any great nation which fails to provide for the utilization of mechanization to the utmost practicable degree must suffer the consequences of neglect in future war. Furthermore, failure to prepare to meet an attack by a mechanized force may result in defeat by troops organized and equipped as of to-day. The Army must adopt, manufacture, and use the various machines incident to mechanized force as of the best known models of to-day provided they are sufficiently better than existing equipment to warrant the expenditure of funds. In short, the Army must be a constantly functioning research laboratory. During the past year an exhaustive study of the matter has been made and a comprehensive report rendered which makes recommendations as to equipment required and costs. Any development of mechanization will demand funds.

ORGANIZATION OF THE ARMY

By William Addleman Ganoe

Major, U. S. A.; Historical Section, Army War College

THE WAR DEPARTMENT

The War Department, as the managing agency of the military forces for the people, is presided over by the Secretary of War, a civilian, who is answerable directly to the President of the United States, the Commander-in-Chief. The Secretary (Patrick J. Hurley) is assisted by the Chief of Staff (General Charles P. Summerall), who oversees the military functions; by an Assistant Secretary, who has charge of the supply, real estate and war industrial plans; and by another Assistant (F. Trubee Davison), who is responsible for fostering Military Aeronautics. Under this combined direction operate the Divisions of the General Staff and the arms and branches of the Army, whose chief yields advice to the Secretary of War through the Chief of Staff, the Deputy Chief of Staff, Major General Briant H. Wells, and the Assistant Secretaries.

THE GENERAL STAFF

Composition and Duties.—The General Staff is composed of officers who are selected from all arms and branches of the Army, and.who are developed by long training and schooling to comprehend every side of the general problems studied by them. From these studies they are required to present to their superiors broad and impartial conclusions for the best interests of the service. On the other hand, the chiefs of the combatant branches and supply and administrative departments are specialists whose force is trained to give technical and specific advice to the Secretary of War through the Chief of Staff concerning the particular conditions which confront the individual branches.

None of the officers of the General Staff or heads or arms or departments enjoys the right to command. The duties of each are advisory, supervisory or administrative. The chain of command is direct from the President of the United States to the Corps Area Commanders in the matter of manipulation of the Army of the United States. The Secretary of War, however, may give orders in the name of the President, to the nine areas of control in the United States proper and to the three in other parts of the world.

Command Divisions.—The General Staff consists of five Divisions, composed of officers of the Regular Army, National Guard and Organized Reserves. The G-1 Division (Brig. Gen. Albert J. Bowley, Assistant Chief of Staff, G-1) is concerned with personnel, the man-power of the Army and nation. The G-2 Division (Colonel Stanley H. Ford, Assistant Chief of Staff, G-2) is concerned with worldwide information, collecting, evaluating and treating it much in the same manner as expert historians. The G-3 Division (Brig. Gen. Edward L. King, Assistant Chief of Staff, G-3) is concerned with the operation of the Army, especially in education and training. The G-4 Division (Maj. Gen. Ewing E. Booth, Assistant Chief of Staff, G-4) is concerned with the housing and maintenance of the Army. The War Plans Division (Brig. Gen. George S. Simonds, Assistant Chief of Staff, W. P. D.) is concerned with the up-to-date defense of our coasts and possessions at any point of possible attack.

ADVISORY BODIES

Combatant.—Other advisory bodies for the Secretary are the offices of the chiefs of the combatant arms and heads of departments and services. The combatant branches are: the Infantry (Major General Stephen O. Fuqua, Chief); the Cavalry (Major General Herbert B. Crosby, Chief); the Field Artillery (Major General Fred T. Austin, Chief); the Coast Artillery (Major General Andrew Hero, Jr., Chief); the Air Corps (Major General James E. Fechét, Chief); the Corps of Engineers (Major General Lytle Brown, Chief); Signal Corps (Major General George S. Gibbs, Chief).

Non-Combatant.—The non-combatant branches are: The Adjutant General's Department (Major General C. H. Bridges, The Adjutant General); The Inspector General's Department (Major General William C. Rivers, The Inspector General); The Judge Advocate General's Department (Major General Edward A. Kreger, The Judge Advocate General); the Quartermasters Corps (Major General Frank B. Cheatham, The Quartermaster General); the Finance Department (Major General Roderick L. Carmichael, Chief); the Medical Department (Major General Merritte W. Ireland, The Surgeon General); the Ordnance Department (Major General Clarence C. Williams, Chief); the Chemical Warfare Service (Major General H. L. Gilchrist, Chief); officers of the Bureau of Insular Affairs (Lt. Col. Creed F. Cox, Acting Chief); and officers and enlisted men of the Militia Bureau (Major General William G. Everson, Chief).*

CORPS AREAS

For command and control, the Army is spread as follows: First Corps Area, including Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut, is commanded by Major General Preston Brown; Second Corps Area, including New York, New Jersey, Delaware, and Porto Rico, by Major General Hanson E. Ely; Third Corps Area, including Pennsylvania, Maryland, Virginia, and District of Columbia, by Major General Fred W. Sladen; Fourth Corps Area, including North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee, Mississippi, and Louisiana, by Major General Frank R. McCoy; Fifth Corps Area, including Ohio, West Virginia, Indiana, and Kentucky, by Major General Dennis E. Nolan; Sixth Corps Area, including Illinois, Michigan, Wisconsin, Jefferson Barracks and Arcadia Target Range, Missouri, by Major General Frank Parker; Seventh Corps Area, including Missouri (Arcadia Range excepted), Kansas, Arkansas, Iowa, Nebraska, Minnesota, North Dakota, and South Dakota, by Major General Johnson Hagood; Eighth Corps Area, including Texas, Oklahoma, Colorado, New Mexico, and Arizona, by Major General William Lassiter; Ninth Corps Area, including Washington, Oregon, Idaho, Montana, Wyoming, Utah, Nevada, California, and Alaska, by Major General John L. Hines; the Hawaiian Department, by Major General Fox Conner; the Philippine Department, by Major General Douglas MacArthur; and the Panama Canal Department, by Major General Malin Craig. These areas and departments are subdivided into tactical divisions and brigades.

OTHER DEPARTMENTS

Directly under the supervision of the Secretary of War, but not belonging to the Army, come the activities of Insular Affairs, Panama Canal, Inland and Coastwise Waterways, River and Harbor improvements, and other civil work, such as administrative duties in the District of Columbia, largely performed by members of the Army personnel.

ARMY STRENGTH

The strength of the Army of the United States on June 30, 1929, was: Organized Reserves, 112,757 officers (including 10,831 officers of the National Guard) and 5,162 enlisted men; National Guard, 12,347 officers and 164,453 enlisted men; Regular Army, 13,313 (including 1,239 Philippine Scout and Warrant Officers) and 124,216 enlisted men (including 6,491 Philippine Scouts).

---

* Although the National Guard is, of course, a combat organization, the Militia Bureau, as a bureau, is here properly listed under the heading "Non-Combatant."

A. TABLE SHOWING THE STRENGTH OF THE REGULAR ARMY OF THE UNITED STATES, JUNE 30, 1928, AND JUNE 30, 1929, AND LOSSES DURING THE FISCAL YEAR INTERVENING

Arm or service	Strength June 30, 1928		Strength June 30, 1929		Losses															Enlisted men returned from desertion
					Enlisted Men															
							Discharged				Died									
	Officers	Enlisted men	Officers	Enlisted men	Retired	Relieved from active duty	Expiration of service	Disability	By sentence of general court-martial	Other causes	Of disease	Of accident	Drowned	Suicide	Homicide	Deserted	Dropped	Total		
General officers of the line	67	......	67	......	....	...	.....	....	....	.....	...	....	...	...	...	.....	....	.....		....
General Staff Corps	213	......	220	......	....	...	.....	....	....	.....	...	....	...	...	...	.....	....	.....		....
Adjutant General's Department	97	......	95	......	....	...	.....	....	....	.....	...	....	...	...	...	.....	....	.....		....
Inspector General's Department	39	......	40	......	....	...	.....	....	....	.....	...	....	...	...	...	.....	....	.....		....
Judge Advocate General's Department	89	......	90	......	....	...	.....	....	....	.....	...	....	...	...	...	.....	....	.....		....
Quartermaster Corps	707	7,363	705	7,543	68	...	1,758	77	130	1,076	17	8	2	5	1	452	48	3,642		224
Medical Department	1,201	6,595	1,187	6,715	20	...	1,463	129	160	1,080	21	4	3	1	2	592	88	3,563		330
Finance Department	121	394	119	401	2	...	74	2	....	36	2	...	...	...	...	5	2	123		2
Corps of Engineers	406	4,468	395	4,579	11	...	825	109	58	886	9	5	3	3	2	364	57	2,332		157
Ordnance Department	271	2,346	278	2,349	47	...	514	28	35	326	9	...	1	1	...	121	6	1,088		66
Signal Corps	210	2,344	215	2,430	5	...	515	27	18	452	6	2	...	...	...	155	20	1,200		68
Chemical Warfare Service	81	450	76	425	1	...	95	2	8	56	1	...	...	...	...	29	3	195		22
Bureau of Insular Affairs	2	......	3	......	....	...	.....	....	....	.....	....	...	...	...	...	.....	....	.....		....
Chaplains	120	......	123	......	....	...	.....	....	....	.....	....	...	...	...	...	.....	....	.....		....
Professors, U. S. Military Academy	8	......	8	......	....	...	.....	....	....	.....	....	...	...	...	...	.....	....	.....		....
Cavalry	626	8,020	613	8,348	43	...	1,853	96	219	1,274	7	13	1	1	5	1,207	212	4,931		566
Field Artillery	960	15,044	919	14,971	35	...	3,086	186	283	2,501	30	25	4	6	3	1,674	277	8,110		797
Coast Artillery Corps	708	11,737	697	12,168	69	...	2,338	174	188	1,901	21	13	4	1	2	770	91	5,572		330
Infantry	2,441	41,005	2,355	41,368	183	...	8,769	664	590	6,702	111	27	12	13	9	3,714	842	21,636		1,631
Air Corps	1,025	9,493	1,192	10,890	31	...	1,739	96	73	2,295	25	47	2	6	1	428	47	4,790		183
Detached list	2,480	5,498	2,546	5,514	101	...	1,045	42	67	419	24	4	2	4	1	180	11	1,900		83
Total, less Philippine Scouts	11,872	114,757	11,943	117,701	616	...	24,074	1,632	1,829	19,004	283	148	34	41	26	9,691	1,704	59,082		4,459

Philippine Scouts:																			
Judge Advocate General's Department	1	....	1	....	...	...	....	....	....	....	...	...	...	...	...	....	....	....	....
Quartermaster Corps	10	469	10	432	...	...	257	7	....	6	4	...	...	...	...	....	....	274	....
Medical Department	....	319	....	327	...	...	147	3	4	8	...	...	...	...	...	....	....	162	....
Finance Department	....	8	....	7	...	...	4	....	....	1	...	...	...	...	...	....	....	5	....
Corps of Engineers	3	314	4	320	...	...	219	3	....	....	...	1	...	...	...	....	....	223	....
Ordnance Department	....	48	....	49	...	...	22	....	....	....	...	...	...	...	...	....	....	22	....
Signal Corps	4	129	2	125	...	...	87	3	....	1	...	...	...	...	...	....	....	91	....
Cavalry	6	609	4	591	...	...	407	8	....	....	3	...	...	...	...	....	....	418	1
Field Artillery	8	874	8	990	...	...	521	9	2	3	1	1	...	...	...	....	....	537	1
Coast Artillery Corps	12	1,478	9	1,295	...	...	478	10	2	3	4	...	...	...	...	....	....	497	....
Infantry	46	2,152	46	2,355	...	...	960	22	1	11	5	1	...	2	...	4	....	1,006	1
Air Corps	1	....	1	....	...	...	....	....	....	....	...	...	...	...	...	....	....	....	....
Detached list	3	....	2	....	...	...	....	....	....	....	...	...	...	...	...	....	....	....	....
Total	94	6,400	87	6,491	...	...	3,102	65	9	33	17	3	...	2	...	4	....	3,235	3
Grand Total	11,966	121,157	12,030	124,192	616	...	27,176	1,697	1,838	19,037	300	151	34	43	26	9,695	1,704	62,317	4,462
Warrant officers:																			
Army mine-planter service	40	....	37	....	...	...	....	....	....	....	...	...	...	...	...	....	....	....	....
Band leaders	93	....	93	....	...	...	....	....	....	....	...	...	...	...	...	....	....	....	....
Others	1,075	....	1,008	....	...	...	....	....	....	....	...	...	...	...	...	....	....	....	....
Total	1,208	....	1,138	....	...	...	....	....	....	....	...	...	...	...	...	....	....	....	....
Retired, on active duty:																			
Regular Army	133	28	131	24	...	10	....	....	....	....	2	...	...	...	...	....	....	12	....
Philippine Scouts	13	....	14	....	...	...	....	....	....	....	...	...	...	...	...	....	....	....	....
Total	146	28	145	24	...	10	....	....	....	....	2	...	...	...	...	....	....	12	....
Aggregate	13,320	121,185	13,313	124,216	616	10	27,176	1,697	1,838	19,037	302	151	34	43	26	9,695	1,704	62,329	4,462

B. TABLE SHOWING THE STRENGTH OF THE REGULAR ARMY, BY CORPS AREA, ETC., FISCAL YEAR ENDED JUNE 30, 1929

Corps area, department, or country	July, 1928			June, 1929		
	Officers	Warrant officers	Enlisted men	Officers	Warrant officers	Enlisted men
First Corps Area	536	77	4,418	493	66	4,433
Second Corps Area [1]	1,133	133	10,573	117	127	10,821
Third Corps Area	1,991	170	12,980	,021	155	12,679
Fourth Corps Area	1,109	92	10,589	1,017	86	10,522
Fifth Corps Area	499	87	3,732	490	81	3,516
Sixth Corps Area	545	69	5,213	565	63	5,749
Seventh Corps Area	897	87	7,911	979	81	7,901
Eighth Corps Area	1,798	157	20,354	1,771	147	21,508
Ninth Corps Area [2]	1,087	150	11,118	1,083	145	11,330
Total in Continental United States [3]	9,595	1,022	86,888	9,536	951	88,459
Hawaiian Department	730	63	13,280	669	57	13,502
Panama Canal Department [4]	409	45	7,980	376	47	8,361
Alaska	12	2	295	12	3	273
Porto Rico	69	4	1,208	66	4	1,126
Philippine Department:						
Regular Army	516	64	3,844	510	70	4,190
Philippine Scouts	89	....	6,243	76	....	6,491
China	53	2	887	51	2	959
Europe [5]	3	3	......	......	3	......
Miscellaneous [6]	622	1	589	879	1	855
Grand Total	12,098	1,206	121,214	12,175	1,138	124,216

[1] Excluding Porto Rico.

[2] Excluding Alaska.

[3] Including personnel of the retired list on active duty.

[4] Includes Panama civil government.

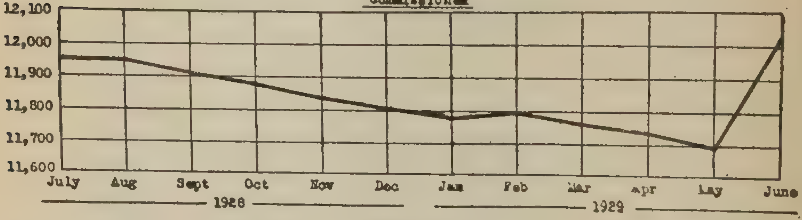
[5] American Graves Registration Service.

[6] Includes military attachés, Philippine Scout officers attending schools, personnel on leave, and en route to and from overseas garrisons.

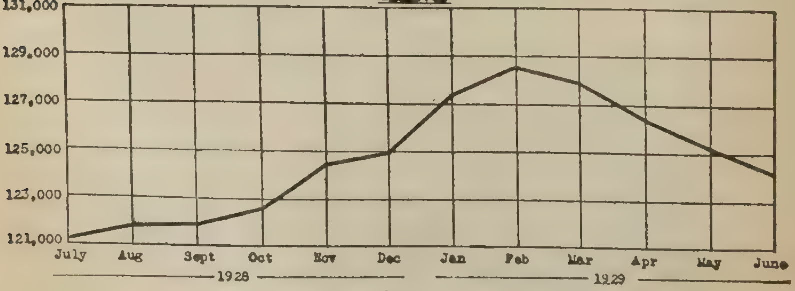
FLUCTUATIONS IN ARMY PERSONNEL

(fiscal year 1929)

Commissioned



Enlisted



ACCOMPLISHMENTS OF ARMY PERSONNEL

By William Addleman Ganoe

Major, U. S. A.; Historical Section, Army War College

THE QUARTERMASTER CORPS

Horse Breeding.—The success of the Quartermaster Corps horse-breeding plan has been further extended with resulting benefit to the Army and civilian breeders. The Remount stud was replenished by 112 stallions, and the supply is still less than the demand. It is estimated that there should be a foal crop of at least 12,000 in the foaling season of 1930 as the result of the operation of the plan during 1929.

Cemeterial.—With the erection of permanent headstones in the form of marble crosses and Stars of David at the graves in the permanent American cemeteries in Europe all work incident to the completion of these cemeteries has been done. During the year, 18 bodies in registered graves heretofore carried as unknown were identified; 47 bodies of those missing or unlocated were recovered; 4 bodies were returned to the United States for shipment to relatives. The total number of interments in these overseas cemeteries as of Oct. 1, 1929, was 30,792 of which 29,149 were known and 1,643 were unknown. An expedition was sent to North Russia for the purpose of recovering and returning to the United States the bodies of deceased members of the American forces which were buried there. In view of the abandonment of certain military posts in Alaska, the remains buried in the post cemeteries are being removed to the Sitka National Cemetery. Under authority of recently enacted law, headstones are to be provided for the graves of Confederate soldiers wherever buried, the same as has been done for Union veterans. The Quartermaster General is handling the detailed plans and arrangements for the authorized pilgrimages to cemeteries in Europe by mothers and widows of members of the American forces. The first trip will occur in 1930.

Relief Work.—Sept. 13, 1928, Porto Rico was struck by the most devastating hurricane in its history and the results of years of private and public enterprise were obliterated in a few hours. Immediately upon receipt of a cable from the Governor of Porto Rico the War Department ordered the transport *St. Mihiel* (at the time en route to Panama) diverted to San Juan to discharge her entire food cargo of 559 tons. Another vessel followed the *St. Mihiel*, laden with tents, cots, blankets, medicines, and about 1,000 tons of foodstuffs. This relief shipment included two general hospitals. The value of these supplies, so vital to the needs and sustenance of the unhoused and injured refugees, amounted to $953,766.35. The commanding general, Second Corps Area, sent a general officer and two assistants to Porto Rico to act for the corps area commander and to coöperate with the governor and the American Red Cross in relief work.

Sept. 16, a hurricane swept across Florida, inflicting great damage in the district between Fort Lauderdale and West Palm Beach. The first notification of the disaster to reach the outside world was sent over the Army amateur radio net, no other means of communication being available. Subsequent reports indicated that extensive property damage and large loss of life had occurred. The commanding general, Fourth Corps Area, took immediate steps to coöperate with the State authorities in relief work, and $61,000 worth of Government supplies were shipped to points where they were most needed.

Feb. 26, Duncan, Miss., was struck by a tornado and the commanding general, Fourth Corps Area, ordered tentage shipped to the ruined town to shelter the homeless residents. This Army property was later sent to Dahomey, Miss., when a tornado devastated the latter town. The quartermaster supplies furnished for the relief of these stricken towns were valued at $2,040.73.

During March, 1929, rivers overflowed at various points in Florida and Alabama. The commanding general, Fourth Corps Area, furnished cots, tents, blankets, and other supplies where they were most needed. In many instances it was difficult to reach the stranded refugees and Army airplanes from Maxwell Field, Ala., supplemented by airplanes from Langley Field and the One hundred and sixth Observation Squadron, Alabama National Guard, kept in contact with 17 isolated towns. Army pilots made 346 flights to the stricken area, entailing a total of 664 hours of flying, and delivered over 27 tons of supplies. The value of the supplies furnished totaled $87,878.94.

April 27, 1929, the commanding general, Fourth Corps Area, directed the shipment of 175 tents, 1,000 blankets, and 500 cots for the use of persons rendered homeless by a tornado in southeastern Georgia. Additional supplies were furnished during the remainder of the month, and Army relief activity continued until May 3, when the situation had greatly improved. Approximately $16,000 worth of supplies were released by the Army to relieve the want and distress of the people in the devastated area.

May 15, 1929, the Cleveland clinic was destroyed by fire, the conflagration causing tragic loss of human life. At the instance of the clinic authorities the Chemical Warfare Service of the Army conducted a series of exhaustive experiments at Edgewood Arsenal, Md., for the purpose of determining the exact cause of the fire and to obtain information of value in the prevention of similar accidents. The experiments cost approximately $5,000.

May 23, 1929, and the week following, floods created a grave situation in the lower Mississippi region. The Louisiana towns of Jena, Johnsville, and Vidalia and the Mississippi towns of Rolling Fork and Grace were burdened with the care and shelter of flood refugees, and the commanding general, Fourth Corps Area, ordered tentage and Army supplies to the value of $12,000 sent to the refugee camps for the relief of the sufferers.

THE SIGNAL CORPS

Radio Service.—During the year five service test articles of the radio beacon were installed and placed in operation, their locations being Mitchel Field, Long Island; Kelly Field, Texas; Chanute Field, Illinois; Langley Field, Virginia; and France Field, Canal Zone. These beacons, developed at the Signal Corps Aircraft Radio Laboratories at Wright Field, Ohio, are of the aural type, and indicate to the aircraft pilot whether he is off his course, and if so, his direction of deviation. A new 5-tube unicontrol aircraft receiver, measuring approximately 14 x 10 x 4 inches and weighing approximately 10 pounds (a considerable saving in bulk and weight over earlier equipment of the same type) was issued to the Air Corps. Several highly portable field radio sets, equipped with double voltage hand generators, thus eliminating both storage and transmitting plate batteries, and reducing the weight of this type of set about 30%, were developed. New direction finding (goniometric) equipment, equipment for tracking meterological balloons, and improved types of equipment for field telephone nets were also developed.

The utilization of Army Communication facilities for the public service has been continued during the year 1929. The Washington Alaska Military Cable and Telegraph System, which is maintained and operated by Signal Corps personnel, has furnished radio and cable service to and from Alaska and the United States and radio service within Alaska. The year 1929 will establish a new record both in the volume and value of radio and cable traffic handled by that System. The Army Radio Net, which has its control station in the War Department Message Center, Washington, D. C., and net stations at each corps area headquarters has, in addition to handling War Department Radio Traffic, furnished free radio service to and from Washington to 55 Federal establishments.

The increase in radio traffic over the preceding year has been approximately 20 per cent, while the decrease in telegraph tolls has been approximately 12 per cent. This speaks well for the efficiency of the Net, as a greater amount of traffic has been handled. During this fiscal year, with decreased expenses for handling, the total value of business, charged at Government rates, amounted to $366,493.87. The total operating costs were $230,150.12, thus producing a net saving of $116,343.75. In addition, therefore, to its primary purpose of being available in case of emergency, the Government has a good investment in the War Department Radio Net.

Rapid progress has been made in the extension of radio plants to meet the increased traffic requirements in the War Department and Corps Area radio nets. In replacing obsolete equipment and in making new installations of radio systems, the latest developments in the radio art have been closely followed. Noteworthy in this respect is the installation of 1-Kw crystal controlled high frequency transmitters of the most modern type at Washington, Omaha, Atlanta, San Antonio, San Francisco, Honolulu and Panama. The installation of a similar type will be completed in the Philippine Islands early in the fiscal year 1930. With the provision of this equipment, the speed and capacity of the radio nets for the transmission of official business has been greatly improved and compares most favorably with present commercial radio systems. With a view to increased efficiency through the elimination of relay stations, the purchase of four 10-Kw high frequency power amplifiers was initiated during the year. These amplifiers will, when received, be installed at San Francisco, California, Headquarters Hawaiian Department, Headquarters Philippine Department, and at Washington, D. C.

Meteorological Service.—The Signal Corps operates thirty-three meteorological stations within the borders of the United States mainly because the Ordnance, Artillery, Air Corps, and other branches require meteorological information. The United States Weather Bureau is charged with furnishing meteorological service for commercial purposes. Weather reports are indispensable in connection with the operation of aircraft, both military and commercial. The establishment of airways for carrying passengers, mail, and express has brought about an increasing desire for more weather reports. Signal Corps meteorological personnel are equipped and trained to make and reduce meteorological observations in accord with standard practice. Interchange of data between the meteorological services of the Weather Bureau and the Signal Corps gives both services the advantage of available information and aids in keeping the Meteorological Service of the Army at a high standard of training.

CHEMICAL WARFARE SERVICE

Chemical Agents.—Technical activities have demonstrated more forcibly than ever before the necessity for providing adequate national defense against the chemical agents of warfare. This is in part due to the advances which have been made in the science of chemistry and also to the great strides that have been made in the mass production of a wide variety of commercial chemicals. No chemical agents which are more effective than those employed in the World War have been discovered, contrary to the very extravagant statements that have appeared in the press, but much more efficient methods for the dispersion of chemical agents have been developed and the rapid expansion of the chemical industry is making it possible to produce these agents in ever increasing quantities. It is equally true, of course, that advances in scientific research and commercial chemical production, make it possible to provide much more adequate defense against chemical agents than ever before. The Chemical Warfare Service has specialized in its investigation of the means for more adequate defense and its accomplishments in this respect are extremely gratifying. This knowledge concerning methods of protecting individuals who may be exposed to toxic vapors and gas has been made available to commercial manufacturers and users of toxic chemicals whose production and use is constantly increasing.

THE ORDNANCE DEPARTMENT

Weapon and Munition Development.—Based upon the experience gained in the World War, new requirements and characteristics for weapons and munitions were laid down and an intensive program of development along these lines has been continuously carried on by the Ordnance Department. As a result, new and more powerful weapons have been developed and many of them approved as standards for issue to the service. Provision has been made for the production of a limited number of these new types of weapons, together with the necessary ammunition of the latest approved type. This effort will provide for a few selected units being equipped with this new material so that they may become familiar with its use under service conditions. The guns and ammunition remaining over from the World War are, however, still maintained as a reserve. The policy of the War Department for industrial preparedness is being actively continued to assure the availability of adequate facilities for such items as may be required in an emergency. This program also calls for having on hand the necessary jigs, fixtures, dies and inspection gauges, so that when these munitions become necessary there will exist a predetermined source of supply and adequate means for their production.

Ordnance Districts.—In order to attain this result, the plan for industrial preparedness has resulted in the organization of fourteen Ordnance Districts in each of which is an organization of eminent civilian business and technical men as reserve officers who are doing in peace time the maximum of practical planning for this war time production. These plans extend to the various plants and factories which signify their willingness to take over a certain amount of this production burden and make such study of the items to be produced and the manner of adapting their plants to the work as is practicable without disturbing their peace time operations.

Anti-aircraft Weapons.—The spectacular development of our military aircraft has been accompanied by equally important improvements in weapons designed to furnish the defense against similar equipment in the hands of a hostile force. The year has witnessed a continuation of the development of anti-aircraft guns, carriages and fire control instruments of specialized types for defense of troops in the field, fortifications, important cities and public works, against the several types of aircraft most likely to seek such objectives.

Guns and Searchlights.—Planes have been perfected which will carry loads of over four thousand pounds. This capacity may be utilized in transporting a single bomb weighing 4,000 lbs. and loaded with a ton of high explosive, or a number of smaller units aggregating the same total in potential destructive force. Such planes will operate at high altitudes and will be necessarily slower and less maneuverable than the lighter attack planes. Cannon of 3″ and 4.1″ calibers firing projectiles loaded with high explosive timed to burst at the computed range of the target have been developed for combatting the bombers. The 3″ gun is mounted on both fixed and mobile carriages and can be used in the defense of fixed fortifications, or in the field. The larger gun is mounted on a fixed carriage and will be used to defend large cities and important public works such as the Panama Canal. The guns are aimed on data furnished by automatic computing machines which are marvels of ingenuity and accuracy. In some cases the guns themselves are actually aimed at the target by automatic means, the gun crews being only required to load and fire. Night attacks need cause no apprehension, as powerful searchlights have been developed in connection with sound and invisible ray detection devices which direct the light on the approaching planes, and permit the guns to be fired with the same accuracy as in daylight.

Rifles.—One of the most promising projects undertaken during the year has been the chromium plating of rifles and machine gun barrels with the idea of increasing the accuracy life of the barrels. A small chromium plating plant employing the latest type equipment has been established which is capable of chromium plating barrels on a small production basis. Tests conducted on a small number of barrels indicate that the accuracy life is increased by from 100 to 200 percent. A large number of barrels are being subjected to tests, and if the results of previous tests are confirmed, it is probable that it will become standard practice to chromium plate all small arms barrels. The development of a suitable semi-automatic shoulder rifle to replace the present Springfield magazine rifle as the arm of the individual soldier is rapidly approaching completion. A competitive test of semi-automatic rifles was held during the year and a number of rifles were submitted by foreign as well as domestic competitors. The results of these tests indicate that it is entirely practicable to obtain a satisfactory weapon within the weight limits imposed. Some minor changes are necessary, and this work is being carried out before further tests are made.

THE INFANTRY

Important studies and tests have been in progress in the reorganization of the Infantry battalion. This study is for the purpose of finding the correct combination of fire units of maximum firepower, especially with additional existing automatic weapons, which, while satisfying such considerations as mobility, vulnerability, practical employment, formation, organization, administration, and supply, will produce the most powerful fighting unit. A most thorough and interesting practical test has been given to various types of Infantry battalions. An experimental howitzer company has been under test during the entire year. The armament was increased from three mortars and three guns to six mortars and three guns. The personnel was increased from six officers and 107 enlisted men to five officers and 197 enlisted men. Preliminary experiment with armor-piercing ammunition for the 37 mm. gun indicates that considerable progress has been made in securing a defensive ammunition against machines in war. The weapon has likewise been redesigned to improve its characteristics as an anti-tank weapon. Tentative regulations for anti-aircraft training of rifle and automatic riflemen of Infantry have been issued and Infantry organizations have trained during the past season under these regulations. The reports of this practice indicate that the Infantry riflemen and automatic riflemen properly trained in offensive tactics against aircraft will form a dangerous menace to low-flying planes. Regulations for the training of machine gun personnel to act offensively against aircraft are in the process of preparation and are expected to be available for issue to the service at an early date. The mobile anti-aircraft mount for cal. .30 machine guns has been service tested during the last year and has fulfilled its promise of furnishing Infantry with a mount which will be suitable for firing both against air and ground targets. This mount has the great advantage of being built to use existing equipment of which great stocks are available. A few additional parts transform the old mount to the new. One regiment of Infantry (34th Inf.) has been equipped with a limited amount of motor transportation of cross country ability to replace animals and animal drawn vehicles for conducting an extended test in motorization. The equipment furnished is to replace animals and animal drawn transportation. A second model of the light tank, *T1-E2*, has been manufactured service tested. This tank is an improved model of the *T1-E1* light tank which appeared last year. It contains those modifications (short of redesign) which were found desirable while testing the first model. Progressive improvement in practice with Infantry arms has been reported during the last target year. Of 24,260 men firing the rifle, 22,747 (93.78%) qualified. Of 6,459 men firing the machine gun, 6,373 (98.54%) qualified. Of 682 men firing the 37-mm gun and 3-inch trench mortar, 661 (98.9%) qualified.

THE CAVALRY

The Cavalry reorganization which became effective during the fiscal year 1928 has demonstrated its practical value. It is believed that this organization is a more efficient and practical one, especially so in view of the number of units (6) in the regiment, considered with the enlisted strength of the regiment (690). In addition to the 1st Armored Car Squadron which was organized in 1928, a second armored car squadron was formed during the past year. At present the latter unit is temporarily stationed at Fort George G. Meade, Maryland, where the personnel, both commissioned and enlisted, are receiving special instruction at the Infantry Tank School. It is contemplated that this unit will be equipped with heavy armored cars of the "Christie" type. Every opportunity is being utilized with available transportation to conduct experiments involving the use of motor vehicles with cavalry troops with a view to increasing mobility. One of the two wagon trains of the Cavalry Division has been replaced by a motor company and several vehicles are now included in each cavalry regiment. During the past year the problem of pack transportation in cavalry organizations, so far as it relates to the manufacture and supply of Phillips pack saddles with respective pack loads, has been completed. Cavalry troops are now enabled to move at a more rapid rate than in the past and with a corresponding increase in efficiency, since it is no longer necessary to await the arrival of the wagon train for the vital equipment and supplies.

THE FIELD ARTILLERY

With the knowledge that little, if any, equipment developed during a war is produced in any quantity during that war, the Field Artillery has considered as one of its paramount peace-time missions the coöperation with the supply departments in the development of the best equipment possible for standardization and quantity production at the outbreak of war. The new 155-mm. howitzer, and the 155-mm. gun and 8″ howitzer, are still in an experimental stage, but could be manufactured in emergency. Commercial motor vehicles are being continuously tested to determine the suitability of improved types for military use.

The great resources of our country in animals, pointing to the continued use of horse traction for the lighter calibers in the warfare of the future, have made necessary that training in animal draft and in horsemanship be maintained at a high standard in the Field Artillery School and throughout the service, and Field Artillery officers have continued to participate with credit in the great international horseshows both at home and abroad, as members of the United States Army Equestrian Team.

THE ADJUTANT GENERAL'S DEPARTMENT

The Adjutant General as the administrative officer of the War Department handles, through his office, a voluminous correspondence with agencies of all kinds, including the military forces in the field, other branches and bureaus of the Government, members of Congress and the public generally. During the fiscal year, 3,107,300 pieces of mail matter were received, distributed to the proper divisions of the office, answered, or otherwise treated. The greatest number of pieces of mail received in a single month was 276,446 in January, 1929, and on a single day 23,375, Dec. 8, 1928. The information section of the office answered inquiries concerning 42,052 individuals and 19,513 of a miscellaneous nature. Of these inquiries, 13,443 represented personal calls at the office and 48,122 were received by telephone. A total of 47,144 telephone calls were made by this section in obtaining the data necessary to answer the inquiries.

THE FINANCE DEPARTMENT

The Finance Department is the agency through which the War Department pays its personnel and bills, and audits the property accounts of its accountable officers. The Chief of Finance is also the Budget Officer for the War Department and as such is charged with the compilation and submission of War Department estimates for funds of the several arms and services to be transmitted to Congress through the Bureau of the Budget. The Finance Department handled during the past fiscal year 521,853 commercial invoices. These invoices had a maturity date on which they were due for the full amount and they also showed the last day on which a discount might be taken. Advantage to the fullest has been taken by the Finance Department of such discounts. Through these prompt payments it has maintained business contact with commercial firms and individual merchants on a cash basis and prompt payments have been one of the factors of the Department's successful operation as a Government agency in meeting all bills incurred by the War Department. During the last fiscal year 858, 377 public vouchers were paid, either in cash or by check on the Treasurer of the United States and the discounts earned were $359,890.31. Since 1920, when all payments have been reduced practically to a cash basis, the Finance Department has saved the Government in commercial discounts the sum of $2,736,935.50. During the last fiscal year 1,839,039 checks were drawn against the Treasury by disbursing officers of the Finance Department. The net disbursements made by the Finance Department during the fiscal year 1929 aggregated $311,005,668.88. The Army maintains a savings bank feature among its soldiers and encourages them to save their earnings by making deposits with the Finance Department. Sums of $5.00 or over may be deposited and at the end of their enlistment they receive this savings fund, plus 4% interest per annum. Cases of enlisted men retiring after thirty years' service in the Army with sums above $5,000 are not rare, and the records show the largest depositor at this time to have to his credit the sum of $13,200. On June 30, 1929, 10,108 soldiers had on deposit $1,641,463.74. Interest payments during the year amounted to $30,659.58. The records in the office of the Chief of Finance show that from June 30, 1873, to June 30, 1929, $67,813,034.07 was deposited, earning in interest $3,644,647.59. The contribution to general welfare of hundreds of soldiers, thrifty, upstanding, clean and disciplined, sent out into the life of communities over the United States every year is a vast asset to the country, often overlooked. This phase of the Army's place as a training school for any pursuit must be considered as a large return to the public from War Department appropriations.

THE JUDGE ADVOCATE GENERAL'S DEPARTMENT

Approximately 1,500 formal written opinions were rendered by the office during the year on questions arising in connection with contracts made under the jurisdiction of the Secretary of War, real and personal property under his control, and claims in favor of or against the Government. Suits involving contracts to the amount of $40,539,454.83, and patent cases having to do with alleged infringements in procurement and manufacture of military equipment to the value of $657,403,578.83 have been disposed of during the past fiscal year. Forty-two admiralty cases involving $1,699,239.60, are pending in the United States District Courts. Forty-five other suits against the United States, involving sums aggregating $237,546.71, are likewise pending. Five cases of the latter class were disposed of during the year, resulting in judgments against the United States for $5,312.45. In suits brought by the United States against contratcors and others, three judgments have been obtained, aggregating $62,577.14. In addition twenty-three compromise settlements amounting to $452,431.48 have been negotiated. Under the War Claims Act of 1928, there were handled 1072 cases involving 5,806 patents. As a legal adviser to the Chief of the Bureau of Insular Affairs, The Judge Advocate General represents our insular governments, and their political divisions or officers, in cases brought up for review from the Supreme Court of the Philippine Islands, the Supreme Court of Porto Rico, and the United States District Court for Porto Rico. In the Supreme Court of the United States seven such cases were pending on June 30, 1928; six new cases were docketed during the fiscal year, making a total of thirteen, all of which were disposed of during the year. In the Circuit Court of Appeals, First Circuit, at Boston, nine cases were pending on June 30, 1928; six new cases were docketed, making a total of fifteen, all of which were disposed of during the year. Fourteen of the fifteen cases disposed of in the Circuit Court of Appeals, and eleven of the thirteen disposed of in the United States Supreme Court, were decided in favor of the Government's contention. During the fiscal year the office prepared about 800 formal written opinions on a great variety of military legal questions not included in any of the foregoing headings. This miscellaneous work also included a great deal of work on the United States Code, the preparation of correspondence courses for reserve officers, studies of proposed legislation and regulations and the drafting of proposed substantive legislation. During the fiscal year 23 reserve officers of The Judge Advocate General's Section were given active duty training in this office and shortly after the close of the fiscal year two regular army officers were selected for detail to take a full course in law at standard law schools. The War Department Law Library in the office of The Judge Advocate General, consisting of approximately 30,000 volumes, received accessions of about 1200 books during the calendar year 1929.

THE MEDICAL DEPARTMENT

During the year the Medical Department was responsible for the professional care and treatment of approximately 283,279 individuals. The average number of personnel treated in hospitals each day was 6400. There was during the year a further decline in the incidence of venereal diseases in the Army. This is the eighth consecutive year that the admission rate from venereal diseases has been lower than the one for the previous year. The rate for the current year is the lowest ever recorded. The annual admission rate for tuberculosis was 2.69 as compared with 2.72 in 1927. This represents the lowest rate for tuberculosis ever recorded in the Army. The compulsory annual physical survey of officer personnel has shown highly satisfactory results. Many basic and minor affections have been detected and corrected. A study of the incidence rate of malaria illustrates well the progress made by the Medical Department of the Army in the application of preventive measures in the control of disease in the Army. In 1903 the admission rate from malaria was 201.17. Ten years later, 1913, it was 36.75; in 1923, it was 9.78 and in 1927, it was 6.73. The most notable scientific contributions of the Department during the past year have been Col. C. F. Craig's improvement and extension of his work on the complement fixation diagnosis of latent amœbiasis and the books of Col. P. M. Ashburn and Col. Edward B. Vedder.

THE MILITIA BUREAU

The reciprocal relationship existing between the state and Federal Governments is administered through a bureau of the War Department called the Militia Bureau, whose chief is a National Guard officer holding a commission in the Officers' Reserve Corps of the Army of the United States. Under this system the National Guard, at the end of the fiscal year 1929, had an authorized strength of 188,000, which was divided among 3,973 organizations located in 1,478 separate cities and towns throughout the United States, Porto Rico and Hawaii. Present approved program for development calls for a strength of 190,000 in 1930, with an eventual strength of 250,000, of which a strength of 210,500 is the objective of 1935. In addition the National Guard has 18 observation squadrons of airplanes which for purposes of administration, training and discipline are attached to and form a part of the infantry divisions in peace time. One other squadron is maintained and carried as Corps Air Service.

The training of these state forces is supervised by officers of the Regular Army and consists of a minimum legal requirement of 48 drill periods yearly, each of not less than one and one-half hours' duration, in addition to fifteen days of field training in encampments or on maneuvers. For these drill periods, compensation is provided from the Federal appropriations for each drill attended by officers and men at approximately one-thirtieth of the monthly pay for like grades in the Regular Army, while compensation for the fifteen days of field training is the same as for the Regular Army. Authority also exists for the attendance of officers and enlisted men at various Regular Army service schools. Since 1920, 2,296 officers have received instruction at these schools and the number admitted is only limited by the availability of funds. Authority also exists for the detail of National Guard officers for duty in the Militia Bureau and on the War Department General Staff, both for the purpose of giving instruction to the National Guard officers and to bring to the consideration of important policies the viewpoint of the citizen-military forces. The above-described democratic citizen-military system under the amended National Defense Act has, since 1920, developed in the country a potential Federal force of 18 Infantry Divisions, 4 Cavalry Divisions, 18 Regiments of Corps Artillery, 8 Regiments of Anti-aircraft Artillery, 14 Regiments, 1 battalion, 1 separate company of non-divisional infantry, 14 Regiments and 5 battalions of Coast Artillery, and 4 Field Artillery Regiments, G. H. Q. Reserve. Although all of these organizations are not completely organized they are sufficiently organized, armed and trained at the present time to perform any duties which from time to time may devolve upon them in the service of the state, and are considered by military authorities to be ready to perform limited military missions on short notice in the service of the Federal Government.

THE BUREAU OF INSULAR AFFAIRS

The Bureau of Insular Affairs constitutes the normal channel of communication in both directions between, on the one hand, the War Department and other agencies in the United States and, on the other hand, the insular governments subject to the War Department jurisdiction. The Bureau's functions are, as regards the insular possessions in question, in many respects analogous to those of a Colonial Office for Civil Affairs. On the one hand, the Bureau is an agency of the War Department, and, as such, is expressly charged with the handling, under the head of that Department, of "all matters pertaining to civil government in the island possessions of the United States subject to the jurisdiction of the War Department." Its detailed activities are not prescribed by Congress, but are subject to the control of the Secretary of War, to whom the services of the Bureau are available, and are utilized for purposes such as the collection and presentation of information relative to the insular possessions under War Department jurisdiction; the initiation and submission of recommendations regarding action that may be called for to meet conditions that arise; the formulation of such general policies and detailed instructions as will reflect the decisions and purposes of the Secretary of War; the communication of those policies and instructions, in appropriate cases, to the insular or other officials charged with giving them effect; and the insuring that they are actually given effect. On the other hand, the Bureau acts, in general, as the representative and, in many cases, as the direct agent of the insular possessions subject to War Department jurisdiction. It endeavors to ascertain and present to the Secretary of War, either for his consideration and action, or, in appropriate cases, with a view to submission, with his approval, to the President or Congress, such matters, pertaining to the insular possessions in question, as may call for Federal legislative or executive action. It assists in connection with the presentation, before the courts of the United States, of cases to which the insular governments are a party or in which they may be interested; it acts upon request of the insular authorities, as their agent in the United States in connection with numerous and varied purposes, such as the investment and disbursement of public funds and the auditing of accounts therefor, the handling of bond issues, the issuance of currency, the procurement and forwarding of personnel and supplies, the obtaining of desired information and many related activities.

Supervision, under the War Department, of Philippine affairs has now been continuously exercised for over thirty years and over Porto Rican matters for about twenty years. During that time, the Bureau of Insular Affairs has handled bond issues amounting, for the Philippine Islands, to over $134,000,000, and for Porto Rico, to over $32,000,000, an aggregate of over $166,000,000; it has purchased of the same bonds, for Philippine Islands sinking fund accounts, nearly $25,000,000; it has handled deposits, in the United States, of Philippine public funds averaging, for the last day of the calendar years 1921-1928, over $45,000,000, and has secured for these deposits interest rates higher than is the average corresponding rate received for United States public funds on deposit; it has supervised in the United States for the Philippine and Porto Rican Governments purchases of supplies averaging annually over $2,500,000 for the last five years. Of the Philippine bond issues mentioned, the Bureau has this year handled the issue of bonds of the City of Manila to the face value of $500,000, and is preparing for the sale before the end of the year of three issues of Philippine Government bonds amounting to $2,750,000. Matters before the Congress relating to insular affairs have engaged a considerable portion of the Bureau's attention during the present year.

THE CORPS OF ENGINEERS

The strength of the Corps at the end of the last fiscal year was 556 officers and approximately 5,000 enlisted men, whose training for national defense is maintained at a high standard. During the fiscal year 1929 troops of the Corps of Engineers completed about 800 square miles of general topographic mapping. These map data are published in quadrangle sheets by lithography by army reproduction plants and become available for public use at a very nominal cost per sheet. The personnel of the Corps of Engineers perform services directly beneficial to the public along many lines. Four of its officers are on duty with the civil government of the District of Columbia, one of whom is the Engineer Commissioner; one is the Director of Public Buildings and Parks of the National Capital and two others are his assistants; three are assigned to duty with the Federal Power Commission; three are on duty with the American Battle Monuments Commission; and one is the Engineer officer on duty with the Arlington Memorial Bridge Commission, supervising the construction of the beautiful Arlington Memorial Bridge. Three officers of this Corps are assigned to the civil government of the Canal Zone, one of whom is Governor. Six Engineer officers are on duty with the Alaska Road Commission and river and harbor duty in Alaska. One officer went to Nicaragua with the American Commission sent there to supervise the presidential election late in 1928.

ARMY AERONAUTICS

By William Addleman Ganoe

Major, U. S. A.; Historical Section, Army War College

AIR CORPS

Aims.—The primary objective of the Air Corps in time of peace is to be ready for immediate and efficient operation in time of emergency. This, of course, requires that tactical units must practice in time of peace those functions they will be required to carry out upon the outbreak of war. To provide the attainment of its proper objectives the Air Corps is at present operating under what is known as the Five-Year Program. The period covered by the first two of the five annual increments of this program expired on June 30, 1929.

Personnel.—The Five-Year Program naturally divides into two sections, personnel and materiel. With the first of these has arisen the most pressing question affecting the Air Corps,—the promotion problem. Sluggish promotion schedules have created a situation wherein Air Corps officers are still performing duties out of all proportion to their rank, and highly trained and experienced enlisted mechanics must for the present be content with grades and ratings far from commensurate with their skill and the requirements of their duties. Relief from these conditions is hoped for from legislation pending in the present session of Congress.

On June 30, 1929 there were commissioned and detailed in the Air Corps 1143 Regular Army officers. The second increment of the Five-Year Program called for 220 Reserve Officers on extended active duty with the Air Corps. A shortage of funds limited this number to 192 actually ordered to such duty. The enlisted strength of the Air Corps on June 30, 1929 was 10,890. An earnest effort was made throughout the year to secure enlisted candidates who would be physically and educationally qualified to complete the courses at the Primary and Advanced Flying Schools. In spite of this effort, the number of enlisted pilots has steadily decreased and, no doubt, will continue to do so until suitable grades are provided by law for the enlisted pilot to make the service attractive to him. Such grades are not available now and most enlisted pilots have qualified largely by reason of their own mechanical ability.

Materiel.—At present the Air Corps has on hand 1273 airplanes and on order, 201. The greatest present need in this respect is for airplanes for training purposes. Congress is looked to for more generous appropriations in the future in order that the finest modern equipment may be purchased and made available for pilots undergoing training. During the past year, airplane development by the Air Corps has been devoted chiefly to the improvement of aerodynamical flying and structural characteristics of service airplanes and the adaptation thereto of several new engines recently developed in the 500-600 horse-power class. Mechanical refinements designed to increase productive engine power have been successfully accomplished, and steps have been taken to accomplish the fabrication of an extremely compact, high-powered engine, whose smooth functioning may uniformly be relied upon. In this field of work, army and commercial aviation benefit mutually from experimentation. However, in adaptations intended for warfare, —gun mounts, bomb sights, and the like—Army research must, of necessity, proceed independently.

MANEUVERS AND FLIGHTS

Joint maneuvers with ground organizations of the Army were held with all branches of the Air Corps participating in the vicinity of Columbus and Dayton, Ohio, during May, 1929. At these places were concentrated the bombardment, attack, and pursuit units stationed within the continental limits of the United States and a portion of the observation units at Mitchell Field, New York, and Fort Riley, Kansas. A total of 288,542 aircraft hours were flown by pilots of the Regular Army, Reserve Corps, and National Guard during the fiscal year 1929, an increase of 81,648 airplane hours over the previous year. This increase can be attributed to the inreased number of flying officers, better equipment, and the great variety of missions performed. However, operations during the past year would have revealed a still greater degree of progress had appropriations been liberal enough to provide the necessary airplanes, hangars, and other essential equipment necessary to the most efficient functioning of all of the units of the Air Corps.

AIRCRAFT ACCIDENTS

During the fiscal year 1929, the Army Air Corps and the Air Corps Reserve flew a total of 263,381 aircraft hours, or over 26,300,000 miles with 60 fatalities in Air Corps equipment, or approximately 440,000 miles per fatality. It is significant that fewer Regular Army pilots were killed during the fiscal year 1929 than any year on record, in spite of the increased number of flying hours.

FLYING SCHOOLS

Without reducing the quality of the pilot, the Air Corps Training Center has raised the percentage of graduates in recent classes from less than 25% to over 40% of those entering the Primary Flying Schools. The principal reason for this desirable result is the higher type of applicant received for flying training.

COMMERCIAL AVIATION

The War Department can expect certain definite military benefits from commercial aircraft and aviation industry. The manufacturing facilities of commercial aviation are a definite asset both in the production of improved aircraft and essential equipment items. Commercial aviation is constantly developing airways, airdromes, communication systems, and meteorological services, all of which may be turned to immediate military account in a war emergency. Commercial flying schools, it is hoped, will eventually conduct all the primary training an army pilot must undergo, thus enabling the Army Schools to devote their curricula to specialized military training. In the realm of specialized research, the Army will derive considerable benefit from commercial experimentation, looking toward improved aircraft performance and definite economies in manufacture and operation. This, however, must be supplemented at all times by definitive military research which will have as its aim the equipping of Army pilots with the most accurate bomb sights, gun mounts, synchronized firing devices, and mechanically perfect machine guns.

MILITARY EDUCATION

By William Addleman Ganoe

Major, U. S. A.; Historical Section, Army War College

RESERVE OFFICERS' TRAINING CORPS

Enrollment.—The Reserve Officers' Training Corps has a total of 112,424 students, enrolled in 321 units located at 226 educational institutions in every state, the District of Columbia, Porto Rico, and Hawaii. Of these units, 221 were senior units with an enrollment of 71,903, and 100 were junior units with an enrollment of 40,521. This important element of our national defense continues to supply the life blood for the Organized Reserves, furnishing approximately 5,000 young officers each year. Its contribution of trained specialists to the Organized Reserves is of inestimable value. The Signal Corps Reserve Officers' Training Corps yearly supplies the Signal Corps Reserve with a valuable type of young officer, graduated in electrical engineering, technically trained in the use of signal communication equipment, destined, for the most part, for life work in technical fields allied to Signal Corps specialties, and ready to take his place with the Signal Corps in time of emergency. As time takes increasing toll of those World War veterans who originally comprised the Officers' Reserve Corps, the Reserve Officers' Training Corps will be called upon to fill the veterans' places with competent young leaders in increasing numbers. At the end of the fiscal year there were 776 commissioned officers, 18 warrant officers, and 924 enlisted men on duty as military instructors at civilian educational institutions. 7,029 selected members of the advanced course attended summer training camps in 1929, where they were afforded a six weeks' period of instruction, which served successfully to round out the theoretical and practical training received on the college campus. During the five years ending with the school year 1928-29 there have graduated from the Reserve Officers' Training Corps, 29,207 college and university students. Of this number 26,135 were tendered commissions in the Officers' Reserve Corps, 25,777 accepted such appointments immediately. Others, disqualified for appointment upon completion of the course by reason of age, later received appointments as lieutenants. At an approximate rate of 5,000 each year, therefore, we find this important element of our national defense furnishing to the Organized Reserves a splendid group of young officers of high intelligence, well schooled in the fundamentals of the military art. There is infused into the Officers' Reserve Corps new life.

Citizens' Military Training Camps.—During the summer of 1928 there were conducted 52 camps at military posts in various parts of the country, to provide for the military instruction and training of civilians and selected warrant officers and enlisted men of the Regular Army. As a result 34,514 trainees completed the course, 20,090 taking the basic course, 9,566 the red, 3,328 the white and 1,530 the blue course. Of the 1,530 trainees graduating from the blue course, 30 were appointed second lieutenants in the Reserve Corps, all of whom had, under present regulations, completed at least one year's service in the Regular Army, the National Guard or the Organized Reserves. Rifle teams consisting of 13 successful graduates from the Citizens' Military Training Camp in each corps area participated in the annual matches at the Ohio State Rifle Range. In 1928 the Veterans of Foreign Wars inaugurated the custom of presenting a suitable medal to the Basic citizens' military training camp student in each of the camps demonstrating the highest proficiency. This year in order more fully to evidence the purpose for which the medal is awarded and to encourage zealous work on the part of the young men in training, this organization has added a citation to the award of the medal. June 19, 1929, a formal presentation of a specimen medal and citation was made to The Assistant Secretary of War. For several years past "Babe" Ruth has autographed baseballs and bats which are awarded to the outstanding athletes at each of the camps. The baseballs are donated by Col. Jacob Ruppert and the bats by the Hillerich and Bradsby Company of Louisville, Ky. May 28, 1929, the presentation was made to the Secretary of War by "Babe" Ruth in person.

INFANTRY SERVICE SCHOOLS

The Infantry School.—Fort Benning, Ga., conducts 8 courses. Of 3,663 officers of Infantry, 2,314 are graduates of one of the courses at the Infantry School. The number of graduates of each course in 1928-29 are: Refresher Course for senior Regular Army officers, 17 graduates; Advanced Course for field officers and senior captains, Regular Army, 87 graduates inclubing 3 Philippine Scouts, 1 Q. M. Corps, 1 Medical Corps, 1 Air Corps, 2 Marine Corps; Company Officers' Course, for Captains and Lieutenants, Regular Army. 148 graduates, including 6 Philippine Scouts, 2 Marine Corps, 2 Cavalry, and 3 Chinese; National Guard and Reserve Field officers' Course. 18 National Guard, and 2 Reserve officer graduates; National Guard and Reserve Officers' Rifle Course. 64 National Guard, and 33 Reserve Officer graduates; National Guard and Reserve Officers' Machine Gun and Howitzer Course. 23 National Guard and 18 Reserve Officer graduates; National Guard Enlisted Specialists' Course. 45 graduates; Horseshoers Course, Regular Army, Enlisted Men. 20 graduates. One of the main objects of instruction at the two Infantry Schools is to make instructors of the students in attendance. The students representing the various branches of the Army of the United States, are upon graduation, sent to widely separated stations and there disseminate correct and uniform methods of training and a knowledge of the latest developments in armament, training, and equipment. A number of important changes in the curricula of the two schools were put into effect during the 1928-1929 courses. Since a satisfactory degree of perfection has been attained in the technique of weapons, the time devoted to this subject has been materially shortened. Likewise drill having

NOTE.—For grades and courses of the Army school system, also the Army Industrial College and the list of General and Special Service Schools, see THE AMERICAN YEAR BOOK for 1927 and 1928.

become standardized and thoroughly disseminated throughout the Infantry Branch, the instruction in this subject has also become shortened. The hours gained by reducing instruction in the subjects mentioned permitted increasing the time applied to tactics, and emphasized that phase which teaches the students to prepare and conduct technical problems for others. Additional time was also devoted to mechanization which has become an important consideration to the Army. The importance of physical fitness to the students has been fully recognized by incorporating periods devoted to practical physical instruction in the schedules.

The Tank School.—The Tank School, under the control of the Chief of Infantry, has in its curriculum an Officers', a National Guard, and Reserve Officers', and an Enlisted Men's course. The one for enlisted men covers motor mechanics, communications, reconnoissance, stenography and typing, light mechanical, light driving, heavy mechanical, heavy driving, tank gunnery, motor vehicle driving, batters repair and maintenance and clerical. In the Officers' Course, there were 36 graduates; in the National Guard and Reserve Officers' Tank School Course, 6 graduates; and in the enlisted mens' courses, 85 graduates. Additional emphasis will be given during the current course on practical tank instruction. About 100 additional hours of motor instruction were added to the course during the 1928-1929 school year. This additional instruction is designed to keep step with the increasing importance of motorization for Infantry. For the coming year, 1929-1930, the number of regular officers attending the course will be increased from approximately 36 to 50. The increase in the number of officers attending the Tank School, is to provide for training officers from Infantry regiments in the use of motors and motor vehicles and equip a nucleus of Infantry officers with the basic knowledge required for further study into the question of incorporating motors into the Infantry.

Infantry Correspondence Course.—The revised Infantry Correspondence Courses have been in use during the past year and in general have proven satisfactory. Based on the applicatory system of instruction, with the number of lessons and subcourses reduced, and with special texts provided, it is believed that the present course is a decided advance over the old course. In compliance with instructions and information issued by the G-3 Section of the War Department General Staff, further improvements are contemplated. During the past year approximately 12,000 students were enrolled in the Infantry Correspondence Courses.

THE CAVALRY SERVICE

The Cavalry School.—The Cavalry School at Fort Riley, Kan., continued during the past year its mission of imparting instruction to selected officers and enlisted men in the technique of cavalry, and in qualifying these individuals for instructional duties with units of the Regular Army, National Guard, Organized Reserves, Reserve Officers' Training Corps, and the Citizens' Military Training Camps. Practically all of the field and senior troop officers of regular units are now Cavalry School graduates. Also, a considerable part of the personnel of National Guard and Organized Reserve Cavalry have attended courses at the Cavalry School. The courses of the Cavalry School curriculum fall under two broad headings: military art and horsemastership. Military art includes tactical subjects, the use of weapons, and history. Horsemastership includes equitation, horseshoeing, animal management, and kindred subjects. In developing the courses of instruction at the Cavalry School during the year it has been the aim to stress the essentials of cavalry training. The importance of turning out competent graduates well qualified to instruct their units and who likewise will be competent instructors themselves continues to be stressed. The courses are: Troop Officers', Advanced, Advanced Equitation, Refresher, National Guard and Reserve Troop Officers', and National Guard and Reserve Field Officers'. 82 regular officers, 27 National Guard, and 6 Reserve officers attended the school during the past year. A total of 27 noncommissioned officers of the Regular Army attended the Noncommissioned Officers' Course and 96 enlisted men attended the Horseshoers' and Saddlers' Courses.

Instruction of Personnel.—The school system being worked out and practically completed will in the future insure that newly commissioned officers will be assured of attending the Troop Officers' Course at the Cavalry School after four years' service with troops. After approximately ten years' commissioned service they will return for the Advanced Course. They will then be available for the Command and General Staff School and, later, for the War College. Annually, selected graduates of the Troop Officers' Course at the Cavalry School and from the Cavalry at large will be detailed to the Special Advanced Equitation Course for higher training in horsemastership. During the school year 1928-29, one cavalry officer attended the French Cavalry School and one attended the Italian Cavalry School. Orders have been issued for one cavalry officer to attend each of the following foreign cavalry schools during the coming school year: France, Italy, Germany, and Poland.

Correspondence Courses.—Supplementing the instruction at Fort Riley, the Cavalry School prepares the Cavalry Correspondence Courses, through the medium of which instruction is being given at present to 1,762 individuals of the Regular Army and civilian components. The value of the instruction in horsemanship at the Cavalry School is shown in the successes of the various service teams participating in horse shows throughout the country.

ARTILLERY

The Field Artillery School.—The Field Artillery School serves as an agency of the Chief of Field Artillery in the development of Field Artillery technique and tactics, and disseminates that knowledge to all components of the Army. Past experience in war has been more thoroughly studied, carefully analyzed, and efficiently applied to present practice than ever before. The Feld Artillery School Extension Courses now constitute an indispensable part of the instruction of those Field Artillery Reserve officers who can not take the regular course at the School. It is safe to say that the Field Artillery School is a greater factor to-day than ever before in the maintenance of the efficiency of the arm. The curriculum embodies different courses for field and battery officers of the Regular Army, National Guard, and Organized Reserves, as well as special advanced courses in horsemanship and motors; for enlisted men of the three components of the Army it offers special training as horseshoers, saddlers, motor mechanics, battery mechanics, and communication specialists. During the school year 1928-29, the following finished the various courses offered in Field Artillery Schools:

Commissioned Graduates

Advanced Officers' Course	29
Advanced Motor Course	5
Battery Officers' Course	67
Advanced Course in Horsemanship	6
Refresher Course	3

National Guard and Reserve

Officers' Spring and Fall Courses	70

Enlisted Graduates

Horseshoer's Course (Spring and Fall)	20
Motor Mechanics	3
Saddlers' Course (Spring and Fall)	11
Battery Mechanics	11

The Coast Artillery School.—The Coast Artillery School, at Fort Monroe, Va., conducts courses for field officers, battery officers and enlisted men of the Regular Army, National Guard and the Organized Reserves. The School keeps abreast with the latest developments in tactics and technique of all types of fixed, railway, tractor and anti-aircraft artillery. The designation of correspondence courses has been changed to Army Extension Courses and they have been made an integral part of the Coast Artillery School. These extension courses are being extensively revised and perfected and in the near future the standard of instruction by correspondence will be as high as it is in our leading commercial correspondence institutes. During the school year 1928-29, the following were graduated from the Coast Artillery School:

Battery Officers' Course	51
Advanced Officers' Course	23
Refresher Course	5
Special Advanced Course	9

National Guard and Reserve Officers.—The National Guard and Reserve Officers' courses have been extended so as to include eight full weeks of instruction. A new course in Advanced Motor Transport was conducted during the first half of the year with satisfactory results. The subjects covered in other courses were the same as for previous years, but the schedule was arranged so as to allow increased time to tactics of seacoast and antiaircraft artillery and to submarine mining.

ENGINEERING AND SIGNALING

The Engineer School at Fort Humphreys, Va., was established for the purpose of developing and standardizing the instruction and training of Engineer officers in the technique and tactics of the Engineer arm, and in the civil duties of the Corps of Engineers. It also instructs and trains Engineer officers of the National Guard and of the Officers' Reserve Corps in duties pertaining to the Corps of Engineers. For the year 1929 there were conducted at the school a Company officers' Course, a National Guard and Reserve Officers' Course, and an enlisted Specialists' Course. Eighteen officers completed the first course, nineteen National Guard and Reserve Officers completed the second course, and thirty-six enlisted students took the Enlisted Specialists' Course. Twenty-one officers pursued engineering courses at civil schools; eleven at Cornell University, one at the Massachusetts Institute of Technology, five at the University of California, one at Babson Institute, Babson Park, Massachusetts, one at Princeton University, one at Renssalaer Polytechnic Institute, one at the Technische Hochschule at Berlin, Germany, and one in L'Ecole Superieure de Guerre, Paris, France. At the end of the year the total enrollment of the Engineer Units, Reserve Officers' Training Corps, amounted to 5,268 and of this number 21 per cent were in the advanced course.

The Signal School.—The Signal School graduated fifty-nine officers from the Company Officers' Course. Of these, seventeen were from the Signal Corps; twenty-three from the Infantry; three from the Cavalry; two from the Field Artillery; one from the Coast Artillery Corps; three from the Marine Corps, four from the National Guard, and six from the Signal Reserve Corps. In the enlisted specialists' school, 143 enlisted men of all combat arms were graduated. The officers' course covered the theory and operation of modern electrical communication equipment together with their coördination and application for military purposes. Enlisted men were taught to be expert telegraph, telephone and radio operators and to be proficient in the management of signal communication stations. During the year there were graduated 17 from the Company Officers' course; 13 from the Three-Month course for National Guard and Reserve Officers; 168 from Enlisted Specialist Courses; 35 from Communication Officers' courses; and 113 from Post School courses. The normal course is nine months in length.

FINANCE AND ACCOUNTING

The Finance School.—The Finance School graduated 50 enlisted men during the past fiscal year. Of these 3 were from the Infantry; and one from the Cavalry. This school standardizes and develops the instruction and training of officers in the administrative and technical duties of the Finance Department and trains selected enlisted men, who have passed a preliminary educational examination, in their administrative and technical duties. It provides a Resident Course for such military personnel, mainly enlisted men, as are sent to the School by the War Department; a Home-Study Course for military and civilian personnel of the Finance Department, and enlisted and civilian personnel of the National Guard assigned to Finance sections of units of the National Guard or employed in finance sections of the Militia Bureau, unable to attend the School in person; a Special Course for officers transferred or detailed to the Finance Department, deemed essential in the conduct of their duties as finance officers; and it prepares the Army Extension Courses (Finance), used in the theoretical education of Finance Reserve officers. The Resident Course, as at present constituted, is divided into two parts: Finance and Accounting, and Property Accounts' Auditing. The Finance and Accounting part of the course includes instruction in the fundamentals of Army finance and accounting and the study of laws and regulations with respect to authority for disbursements. The Property Accounts' auditing course aims to train the soldier to become an assistant to a property auditor and to make him qualified for field service as such. With its small instructional force of twelve, including the Commandant, the Finance School has, since its establishment, made a constructive contribution to the Army, in that it has, since 1920, graduated 612 students. Winter Training is also carried on by the Finance School for the Organized Reserves with a view of fitting them for their duties in case they are called to active duty under the mobilization plan. The school is economically conducted, is an asset to the Army, and is ready and able to meet all demands for the present establishment, and for wartime expansion, should it become necessary.

MEDICAL AND ALLIED SERVICES

The Army Medical School conducts a basic course and an advanced course for officers, and courses for enlisted specialists. The basic course is in the nature of a post graduate study of certain professional subjects in their application to military conditions. The advanced course is a post graduate study in medical specialties such as surgery, clinical medicine, clinical pathology, preventive medicine, roentgenology, ophthalmology and otorhinology. The enlisted specialist courses are for the purpose of preparing certain selected enlisted men of the Medical Department to become bacteriological, chemical and x-ray technicians. An important function of the Army Medical School is the manufacture of vaccines, bacterines, and sera for the use of the Army and of such other branches of the Government services as the Secretary of War may direct. The school also prepares the amboceptors, antigens, blood-grouping sera, agglutinating sera, culture media, and other laboratory supplies required for Army laboratory technique. The school carries on scientific research and investigations to the end that constant improvements in the prevention, control and treatment of disease may be effected. During the school year 1928-29, there were graduated 55 officers from the Army Medical School.

The Medical Field Service School.—The Medical Field Service School at Carlisle Barracks, Pa., is the tactical school of the Medical Department. The school is maintained to standardize and develop the instruction and training of Medical Department officers in the tactics and technique of the Medical Department and to prepare these officers for assignment to duty as instructors with the National Guard, the Organized Reserve and the Reserve Officers' Training Corps. It conducts an advanced course for the training of senior officers in the duties pertaining to division, corps and army surgeons. Courses are also offered for the instruction and training of Medical Department officers of the National Guard and the Organized Reserve in the field duties pertaining to the Medical Department. Enlisted men of the Medical Departments of the Regular Army and the National Guard are trained at this school for duty as noncommissioned officers and as instructors. The school graduated 138 during the school year 1928-29.

The Army Dental School.—The Army Dental School trains officers of the Dental Corps in post graduate professional and technical subjects pertaining to the Dental Service of the Medical Department. It conducts an advanced course in advanced dental technique and trains selected enlisted men of the Medical Department for the duties of dental technicians, dental hygienists and dental mechanics. During the school year 1928-29, the school graduated 19 officers.

The Army School of Nursing.—This school conducts a three-year course in nursing at the Walter Reed General Hospital, Army Medical Center. It gives a complete course in nursing and its graduates are eligible for state registration, membership in the American Nurses' Association, the American Red Cross Nursing Service and for appointment in the Army Nurse Corps. It is recognized as one of the superior nursing schools in the country and its graduates are making enviable reputations. During the school year 1928-29 there were graduated 41 from the school.

The Army Veterinary School.—The Army Veterinary School trains officers of the Veterinary Corps in post graduate professional and technical subjects pertaining to the veterinary service and conducts an advanced course in veterinary medicine and surgery. It also trains selected enlisted men in veterinary specialties which qualifies them for duty as assistants to veterinary officers. Seventeen officers were graduated from the school during the school year 1928-29.

ORDNANCE SCHOOLS

Watertown Arsenal.—Course I of this school is given at the Massachusetts Institute of Technology and covers a period of one year. It consists in general of an advanced mechanical engineering course with special reference to the design of ordinance material. Course II of the school is given at Watertown Arsenal for a period of approximately one year and gives such subjects as metallurgy and foundry and machine shop operation. The Ordnance School is a two-year course for junior officers of the Regular Army, Ordnance Department. It graduates ten men each year. Each year's course is eleven months.

Raritan Arsenal.—Officers are given a course in the construction and operation of all classes of material issued to the Army by the Ordnance Department, while enlisted men are given a similar course and also courses in various trades pertaining to ordnance supply and maintenance. This school graduated 122 in the school year 1928-29.

Ordnance Officers in College.—Four officers of the Ordnance Department attended the Harvard Graduate School of Business Administration in 1929.

CHEMICAL WARFARE INSTRUCTION

The Chemical Warfare School offers five courses annually to officers of the Army, Navy and Marine Corps. The Line and Staff Course is twelve weeks. The purpose of this course is to give officers of all branches of the Army and officers of the Marine Corps such an understanding of chemical warfare as will enable them to command their units with the maximum efficiency with respect to this phase of warfare. 35 officers attended the last course. The Navy Line Officers' Course is of six weeks' duration. This course is given to make officers of the line of the Navy familiar with the tactical uses of chemical agents, the methods of protecting against same and to keep them abreast of new developments in chemical warfare. Two Navy Line Officers' Courses were held during last school year with a total of 51 graduates.

The Naval Constructors' Course is of three weeks' duration. This course is given to officers of the Construction Corps of the Navy for the purpose of instructing them on the technical side of chemical warfare in order that they may have a thorough understanding of this subject to aid them in their work of designing ships for the Navy. The course being conducted at present has an enrollment of 8 officers.

The Field Officers' Course is of four weeks' duration and is for the instruction of field officers who will occupy control positions or other important assignments in their own branches, in modern developments of chemical warfare both in the United States and foreign countries. 37 officers graduated from the Second Field Officers' Course held during the summer of 1929.

The Unit Gas Officers' Course.—The course is of six weeks' duration, and is designed to fit junior officers of the Regular Army, National Guard, Organized Reserves and Navy to act as regimental and battalion gas officers in their own organizations. Methods of protecting personnel and material from gas attacks are the principal studies taken up by this class. 24 officers attended the course in the fall of 1928.

QUARTERMASTER SCHOOLS

Instruction Agencies and Courses. Quartermaster instruction is afforded by the following schools: Army Industrial College, the Quartermaster Corps special schools, the Quartermaster Corps Subsistence School, the Holabird Motor Transport School, the Infantry School, the French L'Ecole de l'Intendance, the Harvard School of Business Administration, the Babson Institute, the University of Michigan, the Philadelphia Textile School, and the Massachusetts Institute of Technology.

The Quartermaster Corps School at Philadelphia is comprehensive in educating quartermasters in administration, supply, transportation, construction, remount service, business management, mobilization plans, military organization, logistics and field exercises. The graduates in the regular course this year included 29 Quartermaster Corps officers, 1 Infantry officer, and 1 Air Corps officer, while 12 National Guard officers and 10 Quartermaster Corps Reserve officers graduated from a special course. There were also 16 warrant officers, non-commissioned officers and enlisted men who graduated from the warrant officers' and non-commissioned officers' course.

Schools for Bakers and Cooks.—Training directives were prepared and approved for use in special courses in mess management at Schools for Bakers and Cooks. Over 650 officers from all arms and services of the Army successfully completed this special course.

Troop Schools at Garrisons.—At garrisons throughout the Army, detailed schedules for a 30-hour course in mess management were used as a basis for instruction, and all officers below field grade who had not previously attended similar courses were required to attend.

Reserve Officer Instruction.—500 Quartermaster Reserve Officers of the branch assignment group received active duty training, while training conferences in connection with inactive duty training were held in various cities, approximately 1000 reserve officers receiving this training. The instructions received by quartermasters detailed to such instructions as the Army War College, the Army Industrial College, the Infantry School, etc., afford special education from the viewpoint of coördination.

Motor Transport.—The Motor Transport School at Camp Holabird, Md., affords practical and valuable technical education in the specialized functioning of motor transport, including the fundamentals of construction, repair and operations of motor equipment, as well as the principles of the efficient use of such transportation. There were 19 graduates of the officers' regular course; 57 of the enlisted men's regular course, 39 of the enlisted men's allied trades course; 8 of the enlisted men's special course (motorcycle mechanic). In addition, 16 reserve officers of the branch assignment group completed a two weeks' training course.

The Subsistence School at Chicago affords specialized instruction in the important function of feeding the Army, including nutrition, methods of purchase, inspection, storage, and issue of subsistence and the efficient messing of troops, and is engaged in practical research work consistent with its functions and has prepared numerous texts of various food products which are recognized as authorities. In addition to the 8 officers of the Quartermasters Corps of the Army who graduated from the Subsistence School, 14 line officers of the Army, 5 officers of the Navy, 1 officer of the Marine Corps and 2 enlisted men of the Quartermaster Corps completed the regular course. 4 officers of the Quartermaster Reserve and 2 officers of the Sanitary Reserve were also trained in a special course. The 14 line officers who completed the course are qualified for detail on the Staffs of

Corps Area Commanders as Assistants to the Inspectors with the duty of inspecting all agencies concerned with the procuring of rations and forage and the handling of the Army ration within the Corps Area limits.

AVIATION

The Army Air Corps Schools furnish excellent instruction in a number of subjects. Flying schools are located at March Field, California, and Kelly and Brooks Fields, San Antonio, Texas. Randolph Field, San Antonio, Texas, is under construction and will eventually care for the heavier-than-air training of the Army. The Primary Flying Schools are maintained at Brooks Field and March Field. Classes commence there three times a year and last eight months. Upon graduation, a student goes to the Advanced Flying School, Kelly Field, to complete a four months' course in specialized flying. A number of graduates of these schools have in the past been released to commercial flying, but graduates are now required to stay with the Service for a period of two years after graduation. This removes the element of competition with commercial flying schools.

The Air Corps Engineering School is maintained at Wright Field, Dayton, O. The object of this school is to standardize and develop the instruction and training of Air Corps officers in the higher phases of Air Corps engineering. The subjects taught include some work in practically all phases of the research, experimental, and engineering development as carried on within the Materiel Division. No attempt is made to specialize the officers in any one of these numerous subjects, but an attempt is made to give them a sound basic understanding of all, with particular emphasis on such subjects as aerodynamics, airplane design, power plant laboratory, engine design, propeller design, airship design, mechanics, and strength of materials and structures. The Engineering School i located at the Materiel Division i order to have the benefit as instructor of the highly specialized engineers employed by that Division. The effectiveness of this plan has been reduced somewhat during the past year due to the resignation of a great number of highly trained civilian engineers. The location of the Engineering School also makes available for instruction the technical facilities of the Materiel Division, such as the power plant laboratory; wind tunnels; and the photographic, chemical, metallurgical and radio laboratories.

The Air Corps Tactical School Langley Field, Va., teaches the tactical doctrines for use within the Air Corps and in association with other forces of the Army.

The Air Corps Technical School is maintained at Chanute Field, Rantoul, Ill., to supply the demand of Air Corps organizations for technically trained men. Courses are given in armament, communication, maintenance engineering, aerial photography, airplane mechanics, crew chiefs, parachute riggers, radio mechanics and operators, engine mechanics, general mechanics, and aircraft welders. The graduates of Air Corps Schools for 1928-29 were: Primary Flying Schools 315; Advanced Flying School, 275; Air Corps Tactical School, 24; Air Corps Engineering School, 11; Air Corps Technical School, 531.

The School of Aviation Medicine under the direction of The Chief of Air Corps, with its instruction personnel furnished by the Medical Department of the Army, operates at Brooks Field Tex., and conducts courses of training for medical officers of the Regular Army, the National Guard and the Reserve, to qualify them as flight surgeons. This important school has made many advances in this new specialty of medicine and has made valuable contributions to the art of safe flying

MILITARY AND NAVAL PENSIONS

By Earl D. Church

Commissioner of Pensions, Department of the Interior

ADMINISTRATION

Establishment of Pension Bureau.—The first step towards centralizing and systematizing the administration of the pension system was taken on March 2, 1833, when the Congress created the office of Commissioner of Pensions who was, under the direction of the Secretary of War, to execute such duties in relation to the various pension laws as may be prescribed by the President of the United States. In 1840, the pension work transacted in the Navy Department was transferred to the office of the Commissioner of Pensions. With the establishment of the Department of the Interior by the Act of March 3, 1849, the Pension Office became a bureau of that Department, the Secretary of the Interior being given supervisory and appellate power over the acts of the Commissioner of Pensions. This is the present legal status of the Bureau of Pensions.

Functions.—The functions of the Bureau of Pensions are two-fold; the execution of the laws granting pensions arising out of service with the United States Military and Naval forces prior to April 6, 1917, and subsequent to July 2, 1921, and the administration of the laws providing for the retirement of civil-service employees. The figures which tell of the yearly activities of the Pension Bureau afford further manifestation of the expression in practical terms of a grateful Nation's sense of an obligation to its armed defenders and their dependents and to its faithful civil employees which can never be fully measured nor discharged.

THE PENSION ROLL

Pensioners.—The fiscal year of the Government runs from July 1 to June 30, inclusive, and reports of annual operations and activities must necessarily be confined between those dates so that comparisons may be made with like operations and activities of prior years. On June 30, 1929, the number of pensioners on the roll was 477,915 as against 491,194 on June 30, 1928, a loss of 13,279 for the year. Of the pensioners on the roll 59,945 were Civil War soldiers; 181,235, Civil War widows; 178,804, Spanish War soldiers; 28,643 Spanish War widows; 14,758 regular establishment soldiers; 3699 regular establishment widows; 5574, Indian Wars soldiers; 4000, Indian Wars widows; 730, Mexican War widows; and 11 widows of soldiers who served in the War of 1812. The last soldier of the War with Mexico was Owen Thomas Edgar, who died in Washington, D. C., September 3, 1929, aged 98 years, 2 months and 17 days. By classes the roll showed 259,127 soldiers, 210,724 widows, 2304 children under 16 years of age, 884 helpless minors, 4423 dependent parents, and 453 Army nurses. The losses by deaths for the year were 43,594, of whom 15,089 were Civil War soldiers and 22,429 Civil War widows.

Pension Disbursements.—The disbursements for pension in the fiscal year 1929 amounted to $229,889,986.46, an increase over the previous year of $924,313.99. While there was a decrease in disbursements to Civil War pensioners of $5,074,886.51, this was more than offset by an increase of $6,171,285.01 in disbursements to Spanish War pensioners. During the year the rate of pension of over 100,000 Civil War widows was increased from $30 to $40 per month by reason of the Act of May 23, 1928, providing the latter rate for Civil War widows on attaining the age of 75 years. The cost of medical examinations of veterans claiming pensions or increase of pensions was $451,680. For personal services, maintenance and operating expenses, the outlay was $1,276,512. The Pension Bureau in 1929 disbursed a total of $246,414,139.08, which required the issuance of 6,154,943 checks.

LEGISLATION

Special Acts.—The Seventieth Congress, in its second Session, passed four omnibus bills granting pensions by special acts of Congress to 3973 individuals. Since March 4, 1861, the Congress has granted pensions by special acts in 76,823 cases. On June 30, 1929, there were 14,302 persons in receipt of pensions by special legislation amounting to the sum of $6,316,660.

Aviation Act.—The only piece of general pension legislation passed during the year was the Act of March 1, 1929, granting double pension for disability or death due to aviation accidents occurring to officers or enlisted men of the United States Army. Double pensions had previously by Act of March 3, 1915, been granted in Navy or Marine Corps aviation accident cases.

PENSION CLAIMS

Bureau Files.—As a priceless byproduct of the pension system the files of the Pension Bureau are the repository of over 7 million claims of all classes containing the biographies of the men who gave themselves to the service of their country in the stress of its several wars—life histories fraught with stories of heroism and devotion, of privation, suffering, and death. How these files enhance in value and interest with the lapse of time is well illustrated by the thousands who now call at the bureau to examine Revolutionary War pension cases and abstract genealogical and historical information. Last yea 13,270 Revolutionary War cases wer drawn from the files, 15,366 communications were prepared in respons to requests for information, and 253 photostat copies of papers were furnished to persons interested in thei Revolutionary War ancestors.

Adjustments of Claims.—As re gards the administration of the civi service retirement law, of the 32,32 claims of all classes before the burea for action, 30,640 were disposed o The number of annuitants on the rol June 30, 1929, was 16,501, of who 12,921 have been retired for age an 3580 for disability. During the yea 23,444 claims for refund of deduction from salary were made by employee separated from the Government service, of which 22,903 were settled, th amount of deductions returned bein $3,645,744.76, to which was adde earned interest amounting to $421 678.78.

Civil Service Fund.—On July 1 1928, the "civil service retirement an disability fund" amounted to $83 078,000.43. During the year ther were added to it $28,019,824.61 deductions from salaries of civil-service employees; $4,550,042.24, interes and profits from investments; an $19,950,000 appropriation from th general fund of the Treasury. Ther were paid from the fund during th year on account of annuities, $12,005,048.88 and on account of refunds $4,067,423.54, leaving a balance in th fund June 30, 1929, of $119,525,394.86.

THE UNITED STATES VETERANS BUREAU

By Frank T. Hines

Brigadier General, U. S. A.; Director, United States Veterans Bureau

COMPENSATION AND CARE

Payments and New Claims.—Military and naval compensation is awarded for death or disability resulting from personal injuries received, for disease contracted, or for aggravation or recurrence of preexisting disability during, or the result of, military service in the World War. On Nov. 1, 1929, compensation was bein paid to 268,641 disabled veterans an to dependents of 89,678 deceased veterans of the World War. During th year ended Nov. 1, 1929, 30,066 ne claims for compensation were receive by the Bureau and approximatel 342,601 adjudications of claims effected.

Medical Treatment.—In addition to compensation benefits, the veteran of the World War with any disability connected with service is furnished with medical, surgical and hospital care. The Directors of the Bureau may, when it appears necessary, supply disabled veterans with appliances such as wheel chairs, artificial limbs, trusses, etc.

Hospitals.—In order to carry out the provisions for care and treatment of the disabled veterans, the Bureau as of Nov. 1, 1929, was operating forty-seven hospitals, and beneficiaries of the Bureau were also being provided with care and treatment in fifty other government hospitals and in one hundred and sixty-seven civil and state institutions. The act governing the hospitalization of discharged veterans with non-service connected disabilities reads as follows: "That all hospital facilities under the control and jurisdiction of the Bureau shall be available for every honorably discharged veteran of the Spanish-American War, the Philippine Insurrection, the Boxer Rebellion, or the World War suffering from neuropsychiatric or tubercular ailments and diseases, paralysis agitans, encephalitis lethargica, or amœbic dysentery, or the loss of sight of both eyes, regardless of whether such ailments or diseases are due to military service or otherwise, including traveling expenses as granted to those receiving hospitalization and compensation under this Act. The director is further authorized, so far as he shall find that existing government facilities permit, to furnish hospitalization and traveling expenses incident to hospitalization to veterans of any war, military occupation, or military expedition, not dishonorably discharged. . . ."

Statistics of Patients.—The total number of ex-service men and women who had received hospital treatment as of Nov. 1, 1929, was 445,148, while 76,415 patients were admitted to hospitals during the past year. The number of patients remaining in the various types of hospitals utilized by the Bureau as of Nov. 1, 1929, is as follows:

	T. B.	N. P.	General	Total
U. S. Veterans'..	5,143	11,098	3,244	19,485
Other Government	1,085	1,538	4,346	6,969
Civil and State..	421	1,304	239	1,964
Total	6,649	13,940	7,829	28,418

Field Clinics.—The Bureau also provides out-patient relief in the clinics established in the field stations for veterans whose disabilities do not require hospital treatment. During the past year a total of 787,739 out-patient treatments were given, while a total of 881,312 examinations were made outside of hospitals.

THE GUARDIAN SYSTEM

Bureau Authority.—The World War Veterans' Act provides that whenever it appears that any guardian, curator, conservator or other person is not, in the opinion of the director, properly executing the duties of his trust or has collected or attempted to collect fees or commissions that are inequitable or in excess of those allowed by law, or has failed to make such payments as are necessary for the benefit of the ward, the director is empowered by his duly authorized attorney to appear and make proper presentation of such matters to the court. Under this provision, it is incumbent upon the Bureau to secure the appointment of persons properly qualified to act as guardian as well as to secure the removal of guardians who have demonstrated their unfitness.

Procedure.—Assistance is rendered to the next of kin in qualifying as guardians of beneficiaries. When it is not possible to find a qualified next of kin to act, reputable banks and trust companies are utilized. The adequacy and solvency of guardian bonds is carefully looked into and when insufficient, recommendation is made to the court that larger bonds be required for the protection of the estate. Guardians are advised of the legal rights of their wards, in order that incompetents and minors may receive all the benefits to which they are entitled. A constant endeavor is made to reduce the guardians' commissions and attorneys' fees to a minimum. To this end regional attorneys of the

Bureau, with coöperation and assistance of service and welfare organizations, have been instrumental in securing legislation in some states reducing court costs, commissions and fees.

Social surveys are made semi-annually of all minors under guardianship, for the purpose of removing any unfavorable conditions that may be disclosed. On Nov. 1, 1929, the Bureau had under its jurisdiction 58,106 wards, of which 35,298 are minors, 21,807 are incompetent veterans, and 1001 are incompetent dependents of deceased veterans.

VOCATIONAL TRAINING

Each honorably discharged veteran of the World War receiving compensation or suffering from a vocational handicap as a result of service, who in the opinion of the director is in need of vocational rehabilitation, was eligible for training. The Act of June 7, 1924, provided that all original entrances into training would be discontinued as of June 30, 1925, and that training of all types would be discontinued as of June 30, 1926. However, the Act of June 2, 1926, amended the latter provision so that trainees could be continued in training for a period not to exceed two years for institutional training and six months for placement training. As a result of these limitations, the training program was completed July 2, 1928. A total of 179,389 veterans were inducted into training. Of this number 128,486 were rehabilitated or completed the prescribed course, and the remainder discontinued training or died.

GOVERNMENT INSURANCE

United States Government life insurance is issued in any multiple of $500, not less than $1,000 or more than $10,000, upon the payment of premiums at a net peace-time rate, with no extra charge for administration or excess mortality due to the hazards of war. The following forms of insurance are issued: ordinary life, 20-payment life, 20-year endowment, 30-payment life, 30-year endowment, endowment at age 62, and 5-year convertible term insurance. The policies carry the usua values common to policies issued b commercial companies, such as extended insurance, paid-up insuranc cash surrenders and loans. Dividend are also paid from excess of interes earnings and savings in mortality Under the original provision, yearl renewable term insurance was issue Legislative provisions required tha all such insurance should be convert into one of the permanent forms enumerated above not later than Jul 2, 1927. The following table shows classification of the insurance in forc as of Nov. 1, 1929:

U. S. Government Life:	Number	Amount
Ordinary Life....	136,197	$ 734,757,317.3
20-Payment Life.	167,492	736,077,501.0
30-Payment Life.	28,667	147,526,117.6
20-yr. Endowment	127,423	380,004,100.5
30-yr. Endowment	34,775	149,191,151.4
Endowm't Age 62	34,645	168,903,890.0
Extended Insur'ce	20,950	62,225,980.0
5-Yr. Convertible Term Ins.	99,268	677,451,805.4
Total	649,417	$3,056,137,863.5

ADJUSTED COMPENSATION

The World War Adjusted Compensation Act, passed by Congress Ma 9, 1924, authorized the payment o adjusted compensation to all veteran of the World War but does not includ any officer above the grade of captai in the Army or Marine Corps or similar rank in the Navy and Coas Guard. The rate of pay for service i excess of sixty days is $1.25 and $1.0 per day and the amount of credit i limited to $625 and $500 for oversea and home service respectively. Th veterans who are entitled to not mor than $50 are paid in cash and thos entitled to more than $50 are give an adjusted service certificate in th form of a 20-year endowment insurance policy for an amount that the adjusted service credit increased by 25% would purchase at the age of the veteran on the birthday nearest the dat of the certificate, if applied as a singl net premium, calculated in accordanc with the accepted actuarial principle and based upon the American Experience Table of Mortality, with interes at four per cent compounded annually. An amendment to the Worl

War Adjusted Compensation Act authorized the Bureau to make loans direct to the veteran; prior to the passage of this amendment, loans that had been secured by adjusted service certificates could be made only by the banks.

The table opposite shows the applications received and adjudicated, together with the loans made under the act as amended.

BUREAU DISBURSEMENTS

The total disbursements made by the Bureau or agencies now comprising it, exclusive of certain expenditures made for hospital construction under the direction of the Treasury Department, approximates $4,910,483,642.81, of which $927,474,443.90 was from funds other than those appropriated by Congress, such as insurance premiums and allotments made by men in service to their dependents.

ADJUSTED COMPENSATION

As of November 1, 1929

	Number	Amount
Applications Received	3,696,373	
Applications Acted Upon:		
Cash Payments:		
Veterans ($50 or less)	122,995	$ 4,284,101.46
Dependents (less than $50)	6,454	174,423.24
Total Cash Payments	129,449	4,458,524.70
Dependents ($50 or over)	95,182	33,947,086.58
Certificates	3,434,700	3,479,958,475.00
$60 Lump Sum Payments		2,553,370.00
Total	3,659,331	3,520,917,456.28
Death Claims Approved	77,085	78,093,545.00

U. S. VETERANS BUREAU LOANS

As of November 1, 1929

Number	1,586,021
Amount	$149,650,190.13
Cash Collections	$5,842,378.17

WATERWAYS AND HARBORS

By Lytle Brown

Major General, U. S. A.; Chief of Engineers, War Department

INLAND WATERWAYS

The principal systems are the Great Lakes, together with the New York State Barge Canal and the Hudson River; the Mississippi system, including the Mississippi, the Missouri, the Ohio, the Illinois to Chicago, and their important tributaries; the rivers of the Atlantic Coast and the intracoastal waterways connecting them; the rivers of the Gulf Coast, and the intracoastal waterway system running from Mobile via New Orleans down the Texas coast, and connecting with the numerous southern Louisiana waterways and with the Mississippi system; the San Joaquin-Sacramento system in California; the Columbia system in the northwest; and the minor Pacific Coast rivers. These are improved over stretches and to depths commensurate with their commercial importance and with the benefits which are derived from them. The Great Lakes, which are really inland seas, have connecting channels from Superior to Erie at least 21 feet deep at standard low water, and corresponding depths are provided at the most important harbors. The New York State Barge Canal, and the intracoastal system from Trenton, N. J., to Wilmington, N. C., have 12 feet. The Mississippi has 9 feet to St. Louis, and 6 feet to St. Paul; the Ohio, 9 feet, with 6 to 9 feet on its main tributaries; the Missouri, a 6-foot project to Sioux City, and the Sacramento a 10-foot project. Various other rivers and waterways range from 7 feet or more to 3 or 4 feet, and those of small importance often have no specified project depth, and are improved simply by the removal of snags and obstructions. The above figures give the *project* depths toward which the War Department is working. They have not yet been attained in all cases, due to limitation in time and funds. Among the important sections not yet to project depth are the Mississippi from St. Louis to St. Paul and the lower Missouri. Work on these is being pushed as rapidly as possible.

Commercial and Economic Importance.—The corrected total of inland waterway commerce for 1928 was 227,300,000 tons, valued at $3,838,000,000. The total waterborne commerce of the United States was 539,200,000 tons valued at $24,159,000,000. Rough estimates indicate that the direct benefits to the public, in the single item of reduced transportation charges on freight actually moving by water, and disregarding all ulterior benefits, are sufficient to pay about every two years the entire sum spent since the beginning of our history in providing all the improvements.

Status of Water Transportation.—Inland waterway transportation, after a widespread decline coincident with the extensive development of railroad facilities throughout the country, has in the past ten or fifteen years shown a pronounced increase. Particularly is this true during late years, which have witnessed a great increase in the business handled on inland waterways and in the domestic trade of our ocean ports. The pronounced trend toward a more extensive use of waterways is due to a number of causes. Among these is the realization that under suitable conditions as to character of traffic, origin and destination with respect to waterways, suitable channels, and modern carriers and terminals, water transportation is inherently cheaper than any other form. The heavy horizontal increases in railroad rates have imposed a burden upon the lower classes of traffic, which has made imperative the demand for more economical transportation. Waterways are particularly valuable in the handling of raw products and low grade commodities for which the economic necessities of the country demand lower transportation costs than railroads can afford. There is a growing realization that the three means of internal traffic, viz., railroads, waterways and highways, are properly coöperative rather than competitive. There is also a distinct tendency toward providing modern and efficient carriers, terminals and transshipme
facilities.

In no section of the country is th
more evident than in the Mississip
Valley. The Mississippi up to Cai
has been served for several years b
the Inland Waterways Corporatio
and this service has now been e
tended to St. Paul and Minneapoli
On the upper sections of the Ohio sy
tem there has long been intensiv
traffic, such as the coal movements o
the Monongahela, Allegheny an
Kanawha, and the Ohio itself. Wit
the completion of the river improv
ment, whereby it is tied to the Missi
sippi with a year-around 9-foot cha
nel, the great steel companies of th
upper valley have spent large sums fo
a new floating plant, and are increa
ing their shipments by way of th
river. There is also a growing deman
for the establishment of addition
efficient common carrier service on th
Mississippi and its tributaries, as wel
as on numerous other importan
waterways throughout the country.

Inland Waterways Corporation.—
This corporation was created June
1924, by an act of Congress. It repre
sents a re-organization of the Federa
Barge Line created during the wa
and in its present form is a corpora
tion, functioning like any other, bu
controlled by the Government throug
the Secretary of War. The presen
chairman and executive officer i
Major General T. Q. Ashburn. It ha
for some time been operating a flee
of modern barges and towboats on th
Mississippi River from New Orlean
to St. Louis, on the Warrior River i
Alabama, and over the intermediat
sheltered intracoastal waterways, an
the service on the Mississippi has bee
extended to St. Paul and Minneapoli
It handles freight of all kinds—lo
medium, and high grade. Operatio
of the barge line since the close of th
war has not, until recently, resulted i
a material direct return on the inves
ment. The reasons are many, but esse
tial equipment was lacking and joi
rates with connecting railroads we
not existent. Conditions are co
stantly improving, particularly in th
rate situation. During the calend
year 1928, the corporation handle

1,758,244 tons of commerce, of which 1,555,208 tons pertained to the Mississippi Division and 317,389 tons to the Warrior Division. A total of 114,353 tons of commerce was interchanged between the respective divisions, hence the total of the commerce carried by the divisions will exceed the total tonnage handled by the corporation by a like amount. The net results to the people of the United States up to the present are the recovery of an actual war loss of some $7,000,000 and an annual saving in freight rates of more than $1,000,000.

NEW WATERWAY PROJECTS

Deepening of River Channels.—By the act of January 21, 1927, Congress adopted 24 projects for inland waterway improvement, besides 9 for Great Lakes Harbors. These include both new projects and the extension of existing ones. Among the important projects adopted are those for a 9-foot channel in the Mississippi River from Cairo to St. Louis; for a 6-foot channel in the Missouri River from Kansas City to Sioux City; for a 9-foot channel in the Illinois River from its mouth to Utica; and for the extension from Beaufort to Wilmington, N. C., of the 12-foot Atlantic intracoastal waterway, of which Beaufort had previously been the southern terminus.

Reports of Engineer Corps.—During the fiscal year 1929, the Corps of Engineers completed and submitted to Congress 59 reports on proposed new projects for inland waterways. Of these, 28 reports were favorable for improvement, and 31 were unfavorable.

Mississippi Flood Control.—By the act of May 15, 1928, Congress adopted the plan of the army engineers for the control of floods in the alluvial valley of the Mississippi. This plan is definite and comprehensive and differs in engineering principle from those used in the past. It protects against the greatest flood predicted as possible by experts on the subject. The flood channel of the Mississippi has in the past been so restricted that the river is no longer able to carry within existing levees a flood of the size of the one experienced in 1927, or floods of greater magnitude which are predicted as possible of occurrence in the future. The new plan provides that the river shall be restricted less and permitted to have more room. In general terms this will be done by allowing the flood waters to use parts of natural lateral flood channels in critical sections, by moderate raising and considerable strengthening of the main line levees, and by a spillway above the city of New Orleans for the protection of that place. The amount authorized to carry out the project is $325,000,000, and it is contemplated that the work will be prosecuted at the rate of about $30,000,000 a year.

Other Flood Control Plans.—In addition to flood control for the alluvial valley, investigations and surveys have been authorized for other streams throughout the United States to determine the advisability of flood control improvements as well as works for navigation, water power and irrigation. The army engineers are making these investigations and surveys and it is probable that some of the reports will be transmitted to the 71st Congress.

Pending Projects.—The following major proposals for new or extended inland waterways developments are now up for study, recommendations thereon not having been formulated: deepening the channel of the Mississippi River from the mouth of the Missouri River to Minneapolis to 9 feet; deepening the channel of the Missouri River from Kansas City to its mouth to 9 feet; barge canal between the Ohio River and Lake Erie; 40-foot channel in the Delaware River from Philadelphia to the sea; barge or ship canal across New Jersey from the Delaware River to New York Harbor; extension of the Gulf Intracoastal waterway from Corpus Christi to Point Isabel, Tex.; waterway from Cumberland Sound on the coast of Georgia to New Orleans.

PORTS

Eastern Seaboard.—New York, the major port of the nation, handles nearly 25 per cent of our foreign commerce, and is especially notable as the principal port for the foreign and coastwise movement of high grade package freight. Other major northeastern ports are Portland, Me., Boston, Philadelphia, Baltimore, Norfolk and Newport News. Secondary northeastern ports are notably Providence and the other southern New England ports, whose principal commerce is inbound coal, lumber and petroleum products, and coastwise miscellaneous traffic with New York.

South Atlantic and Gulf.—Major South Atlantic ports are Wilmington, N. C., Charleston, S. C., Savannah and Jacksonville, with a growing general commerce in some cases, but specializing on bulk commodities. To these should be added Miami, a coastwise port which has made tremendous progress with the growth of the State of Florida. The major Gulf ports are New Orleans, with a very large general commerce; Houston, Galveston and Texas City, with a large commerce in grain, petroleum products, cotton and other commodities; the Sabine ports, primarily oil shippers; and Mobile. Other South Atlantic and Gulf ports include Fernandina, Tampa and South Boca Grande, fertilizer shippers; Freeport, Texas, sulphur shipper; Key West, primarily a car-ferry port; the new port of Corpus Christi; Brunswick, Pensacola, Pascagoula, Gulfport, and others.

Pacific.—The major Pacific ports are Los Angeles, San Francisco, Portland, Ore., Seattle and Tacoma. Los Angeles has developed a tremendous commerce, most of its tonnage being local outbound oil and inbound lumber, but general cargo is increasing. The others are ports of general commerce. The secondary ports of the Pacific, include San Diego, several California oil ports, and the lumber ports of the northwest.

Deep Ports.—Of the major ports a few have channels with improved depths as great as 40 feet. These are for special traffic, such as the largest Atlantic and Pacific liners and the largest oil tankers. In general, the standard depth which is being provided and maintained for ports of general commerce is 30 feet at mean low water. This is ample in nearly all cases. Statistics show that of the commercial vessels passing through
the Panama Canal about 95 per ce
draw less than 30 feet, and the sam
general rule applies for the shippi
of the world. Smaller ports handli
a coastwise business primarily are b
ing maintained at depths of from
to 25 feet, and the numerous fishi
ports, or ports on sheltered wate
such as Chesapeake Bay, often ha
channels of 12 feet or less.

New Port Projects.—Including ne
projects and extensions of existi
projects, there were adopted by th
River and Harbor Act of January 2
1927, 18 new projects for improvemen
at ports. Among these is the author
zation of a 40-foot channel to New
port News, Va. (now about 75 pe
cent completed), a 26-foot channel t
Stockton, Calif. (on which only pre
liminary work has yet been done)
and provision for the purchase of th
Cape Cod Canal, which was take
over by the United States April
1928, and now provides a safer pas
sageway, free of tolls, in a localit
very dangerous for vessels. During th
fiscal year 1929, 21 reports on pro
posed port projects were submitted b
the War Department to Congress. O
these 12 were favorable for improve
ment and 9 were unfavorable.

Port Facilities.—The period fol
lowing the World War has been on
of great activity in port organizatio
and port development. The Army sup
ply bases built at Boston, Newark
New York, Philadelphia, Norfolk
Charleston and New Orleans have bee
leased for commercial shipping, ex
cept for reservation of sufficient spac
for military needs. The dry dockin
and repair facilities provided for th
Emergency (now Merchant) Flee
have also proved of great value t
merchant vessels, particularly on th
Atlantic and Gulf coasts, where som
ports were previously without suc
facilities. Active construction of pier
and wharves has been in progress i
most of the established ports; othe
ports have organized, and are co
templating improvements; and som
localities not now ocean ports are e
tablishing facilities for such busines

The Port of New York Authorit
formed jointly by the States of Ne
York and New Jersey and sanctione

by Congress, after extensive investigation, is now engaged in carrying out plans for the comprehensive development of the port of New York and the coördination of its rail and water facilities. The plans contemplate the construction of an outer, a middle, and an inner belt line and an automatic electric system. The middle belt line is designed to provide the shortest connecting link between all railroad lines, connection between the belt line on the west side of the harbor with that on the east side being made by a tunnel to be constructed beneath the bed of the Upper Bay, New York Harbor, between Greenville, N. J., and Bay Ridge, Brooklyn, N. Y. An essential part of the plan consists of many belt lines to promote and serve industrial developments and water fronts. Several years will be required to design, construct, and install the complete system. To afford relief in the meantime, it is proposed to establish motor-truck service between the railroads of the port district and the island of Manhattan. Port Newark has increased the facilities of New York Harbor by the development of ocean terminals, and further extension will be provided when a project at Jamaica Bay has been completed.

Delaware Basin. — Commodious piers have been added to the well equipped waterfront of Philadelphia. The facilities at Norfolk have been increased by the construction of coal loading piers of great capacity and high efficiency, of other wharves, and of a large grain elevator. Wilmington, Del., has completed a modern terminal capable of docking several ships at one time.

South.—Notable waterfront activity is shown at Mobile, Ala., where extensive terminal facilities have been constructed. Miami, Fla., has also found necessary a considerable expansion of its facilities. Houston, Tex., once an inland city, has in recent years developed on an artificial ship channel an extensive port, handling a large tonnage of oil, cotton and miscellaneous freight.

Pacific Coast.—On the Pacific Coast there has been a considerable expansion of facilities, notably at Los Angeles, where the commerce has increased enormously in recent years. San Francisco, Portland, and Seattle

Waterways	Short Tons	Value
Hudson R., middle stretch	6,740,559	$ 108,381,785
Hudson R., upper stretch	1,471,679	101,274,331
Delaware R., above Philadelphia	5,063,776	17,837,687
Chesapeake-Delaware Canal	700,413	47,892,731
Waterway from Norfolk, Va., to the Sounds of No. Carolina	181,907	3,797,370
Inland Waterway from Norfolk, Va., to Beaufort Inlet, N. C.	709,640	28,210,715
St. Johns R., above Jacksonville	297,477	18,831,373
All others, Atlantic Coast	13,020,285	399,296,869
Tombigbee-Warrior System	1,760,746	29,929,208
Southern Louisiana Waterways (excluding Mississippi R.)	3,566,194	60,387,232
All others, Gulf Coast	14,269,718	240,347,510
San Joaquin R.	984,326	43,378,146
Sacramento R.	991,528	77,747,732
Columbia R. and lower Willamette below Vancouver and Portland[1]	7,751,621	68,374,215
All others, Pacific Coast	14,202,723	154,401,106
Mississippi R., below Vicksburg (excluding ocean commerce)	4,442,792	218,611,825
Mississippi R., Memphis-Vicksburg	4,803,840	239,412,823
Mississippi R., Cairo-Memphis	2,531,256	136,714,907
Mississippi R., St. Louis-Cairo	1,430,183	69,090,428
Mississippi R., above St. Louis	1,113,652	17,056,027
Ohio River	20,938,267	191,519,168
Monongahela R.	27,412,143	170,974,558
Allegheny R.	3,692,584	10,144,866
Kanawha R.	1,595,846	7,332,986
All other, Mississippi System	11,833,793	126,912,716
All others in United States	106,481,737	$1,568,023,850
Total	257,988,685	$4,155,882,164

---

[1] Exclusive of ocean traffic.

have also found it necessary to provide large additional accommodations for their water-borne traffic.

Minor Projects.—Somewhat less extensive, but nevertheless important, additions to waterfront facilities have been provided at Portland, Me., where a state pier has been built, at Boston, Mass., Baltimore, Md., Charleston, S. C., Jacksonville and Tampa, Fla., San Diego and Richmond, Calif., and Tacoma, Wash., and a new port has been formally opened at Corpus Christi, Texas.

INLAND WATERWAY AND COASTWISE COMMERCE

The above table shows freigh traffic for 1928 of waterways whic have been under improvement b the Federal Government, excludin short deep stretches of rivers (lik the lower Hudson and Delaware) which are really approaches t ports.

The following table includes inter nal waterways other than those unde improvement by the Federal Govern ment:

Waterways	Short Tons	Value
New York State Barge Canal	3,089,998	$ 180,627,41
Lehigh and Delaware Division Canals, Pa.	329,759	1,607,91
Chicago Sanitary Drainage Canal	213,626	2,783,92
New Basin Canal, La.	324,197	3,570,56
All others of record	976,660	$ 59,679,12
Total	4,934,240	$ 248,268,94
Total, corrected for duplications because of commerce moving over two or more waterways	227,300,000	$3,838,000,00

GRAND TOTAL OF CORRECTED INTERNAL WATERWAY COMMERCE

Year	Tonnage	Value	Year	Tonnage	Value
1920	125,400,000	$2,814,600,000	1925	204,569,010	3,950,450,00
1921	116,300,000	2,443,500,000	1926	217,000,000	3,680,000,00
1922	111,800,000	3,177,900,000	1927	219,000,000	3,930,000,00
1923	153,700,000	2,960,200,000	1928	227,300,000	3,838,000,00
1924	173,200,000	3,446,000,000			

COASTWISE COMMERCE

(including intercoastal)

Port	Tonnage, both ways	Value
Portland, Me.	2,310,110	$ 84,283,936
Boston	1,938,351	12,734,997
Providence	4,503,997	429,426,706
New York	39,038,552	2,590,582,291
Philadelphia	13,133,654	750,827,992
Baltimore	4,484,862	206,212,444
Norfolk-Newport News	17,449,486	552,028,854
All others, Atlantic Coast	38,877,423	$ 2,239,509,743
New Orleans	2,867,903	$ 175,943,297
Galveston, Houston, Texas City	11,780,275	565,689,601
The Sabine Ports	15,584,219	278,308,478
All others, Gulf Coast	10,699,672	$ 248,636,670
Los Angeles	18,510,637	$ 778,195,693
San Francisco Bay and Harbor	22,949,836	1,154,541,921
Portland, Ore.	3,482,937	229,644,536
Tacoma	4,416,774	90,080,119
Seattle	7,715,279	451,494,099
All others, Pacific Coast	14,483,443	269,528,570

Port	Tonnage, both ways	Value
Hawaii, Porto Rico and Alaska	4,279,935	$ 387,081,40
Total	238,507,345	$11,494,751,35
Total, corrected for duplications of "receipts" and "shipments"	119,253,672	$ 5,747,375,67

COMMERCE THROUGH PANAMA CANAL

(short tons)

Fiscal Year	Intercoastal	Total
1921	1,372,388	11,599,20
1922	2,562,527	10,884,91
1923	8,068,553	19,567,87
1924	13,527,378	26,994,71
1925	9,496,259	23,958,83
1926	9,871,210	27,747,54
1927	11,365,592	31,078,00
1928	10,833,443	33,186,39
1929	10,588,466	33,186,39

OHIO RIVER NAVIGATION DEVELOPMENT

By Lytle Brown

Major General, U. S. A.; Chief of Engineers, War Department

Canalization Completed. — The opening of the completed lock system on the Ohio River was celebrated on October 17, 1929. The consummation of that achievement provides 9-foot year-round navigation from Pittsburgh, Pa., to Cairo, Ill., a distance of 981 miles. Its completion marks another great achievement in an effort for water transportation covering more than a hundred years. The Ohio River proper is formed by the confluence of the Allegheny and Monogahela Rivers at Pittsburgh, Pa., flows in a general southwesterly direction, and empties into the Mississippi River at Cairo, Ill. Its width between banks varies from about 1,200 feet in its upper reaches to about 4,000 feet near its mouth, and its slope varies from 11½ inches per mile in the upper reaches to 3 inches per mile near its mouth. For many years the people of the Ohio Valley labored to procure the canalization of the Ohio River by the Federal Government, to make of it, in combination with other improved rivers, a great inland transportation route. Their dream has at last been realized.

Economic Significance.—The Ohio traverses the industrial heart of the country. Starting at Pittsburgh, it connects the important cities of Steubenville, Wheeling, Huntington, Cincinnati, Louisville, Paducah, and Cairo. The river carries the products of its own broad valley as well as those of its tributary streams, which contribute cargoes of coal, cement, oil and every variety of natural and manufactured product. It becomes a vital part of the great Mississippi River system, with its important tributary, the Missouri, stretching into the harvest fields of the northwest, and the Ohio stretching eastward from Illinois tapping and serving through its tributaries the coal fields of Kentucky, Tennessee, Pennsylvania and the Virginias, while the Illinois and Great Lakes waterway will serve the individual cities situated on the Great Lakes. The Ohio thus becomes an important link in our proposed transportation system of 9000 miles of connected waterways of standard channels, serving 20 states, starting at the head of navigation in the Great Lakes and extending through Chicago to the Gulf of Mexico on the South, and an east and west system from Pittsburgh on the east to Kansas City and Sioux City on the west. This vast system, furnishing cheaper transportation for grain and heavy bulk commodities throughout this great agricultural and industrial part of our country, contains economic possibilties for future growth, development and prosperity that few have visualized. With an abundant supply of raw materials furnished at greatly reduced cost because of cheaper water transportation, a new and powerful impetus will be given to the great industrial establishments of the Middle West. With reduced freight rates on the products of the farm, needed assistance will be given to place agriculture on a more profitable basis.

The completion of this project is of vital importance to the vast industrial region through which the river flows and will be of increasing value to the trade and commerce of the whole country. The Ohio's importance as a link in our national waterways system is due to the fact that on or near the river's banks are enormous deposits of mineral wealth, which is the basis for the most highly developed industrial district in the United States. Immense quantities of coal and coke are shipped from the mines along the Monongahela to the steel mills and other industrial plants along the Ohio. The great steel companies are using river transportation more and more to reach the markets of the Middle West, South, Southwest and West. Oil companies are finding that they can lower their transportation costs and reach additional markets by water transportation and tank barges are now in service on the Monongahela, Ohio and Mississippi Rivers.

History of the Project.—The improvement of the Ohio was first undertaken by the State of Kentucky in 1825. Subsequently all work was taken over by the Federal Government, but it was not until 1879 that Congress authorized the construction of a lock and dam about five miles below Pittsburgh. This proved to be the beginning of a slack water system for the entire river. The project at first contemplated a depth of only 6 feet and covered a distance of but 90 miles, but additional improvements were authorized from time to time and in 1910 a project was adopted calling for a 9-foot channel for the entire river. That depth was to be obtained by the construction of 54 locks and movable dams. As this great undertaking progressed, modifications were found necessary, but the completion of fifty dams, all but one of them being of the movable type, each with a lock chamber 110 feet wide and 600 feet long, gives an assurance of continuous navigation except when interrupted by ice and floods.

Cost and Utility.—The cost of this great improvement approximates $118,000,000, a vast sum, but increased traffic has brought prompt justification for each successive improvement and now, with the completion of the project, it is hoped that a justifiable use will be made of this river highway. A corresponding increase in river commerce has followed the improvement of each section. The traffic on the Ohio River alone has increased from 4,600,000 tons in 1917 to 15,737,000 tons in 1925, and 20,938,000 tons in 1928. Considering the Ohio and its eighteen navigable tributaries, the gross traffic has increased from a little more than 27 million tons in 1917 to 56 million tons in 1927. The aggregate value of last year's cargoes approximated $750,000,000. At Ashland, Kentucky, in September, 1927, river craft in transit for that month showed a total of 1,200 barges, 147 tow-boats, fifty-five packets and sixty-six smaller vessels of various types.

All-year Navigation.—Prior to the construction of the locks and dams, the river was navigable only 212 days in the year. Now that it has been harnessed for low water seasons, a continuous navigation stage is assured for every day in the year. With a uniform 9-foot stage from Pittsburgh to Cairo, the Ohio is destined to be of increasing importance as a carrier of heavy and bulk freight. Packets will run on regular schedules; barges will be constantly available for the transportation of coal, iron and bulk commodities. Every indication points to an increasing tonnage on this broad water highway provided by nature and improved by the skill and genius of man.

THE ORGANIZATION OF THE NAVY

By William Ledyard Rodgers

Rear Admiral, United States Navy

ADMINISTRATION

Shore Establishment.—The Navy does its work on the sea but it draws its men, ships, and supplies from the land and is directed by the President who is its constitutional Commander-in-Chief. Consequently, the foundation of naval efficiency lies in a sound organization and administration of the shore establishment of the Navy. By authority of the Constitution, supplemented by legislative action, the President delegates his authority to the Secretary of the Navy who maintains and operates the Navy according to law and with the money appropriated by Congress. When the Secretary is absent from his post, the law authorizes an Assistant Secretary to operate the Navy as the temporary holder of the delegated authority of the President. Like every other business institution, the naval organization must provide for two main tasks. It must maintain itself in efficiency, and it must direct its effort wisely towards the objective for which it exists. In military phrase, the management of maintenance belongs to the routine staff; the direction of effort belongs to the general staff, or, as it is officially designated, the Office of Operations.

Bureau of Navigation.—The maintenance of the Navy falls under two heads: (A) Personnel; (B) Material. The Bureau of Navigation deals with all matters affecting the enlistment, discharge, training, administration and discipline of the personnel of the Navy. It manages the Naval Academy, the Hydrographic Office, the Naval Observatory and the Naval Home for retired seamen. The Bureau is responsible for training individuals, but not for ship efficiency. Besides the training stations where recruits get their elementary naval training, the Bureau maintains various technical schools for electricians, machinists, torpedo and radio men, cooks, etc. In regard to officers, the Bureau manages the Naval Academy for midshipmen, who are appointees of the President and of Congress. They are there trained in mathematics and the English branches as well as in the technical arts and sciences pertaining to the Navy. Midshipmen are also drilled in the use of the weapons and machinery used on shipboard. The Bureau fixes the proper complements to man each type of ship, assigns individuals to specific duty here or there, and transports them from place to place when travel is necessary. The Bureau keeps the records of both officers and men.

Bureau of Medicine and Surgery.—Its duties are suggested by its name. It directs the hospitals and the medical work on board ship through the surgeons, dental surgeons, hospital-corps, and female nurse-corps of the Navy. (The last named do not serve on board ship.) Besides the care of the sick and injured, the Bureau supervises hygiene, both ashore and afloat. It examines physically all recruits before enlistment, and keeps medical records of all in the service for reference in case of disability and for the information of the Pension Office.

Materials Bureaus.—The four material bureaus are Construction, Engineering, Ordnance and Aeronautics. The first designs and builds the ships of the Navy. The second is in charge of engineering including the design and manufacture of steam, electric and motor engines and of radio installations. Both of these Bureaus have experimental research stations to promote their efficiency. The Bureau of Ordnance designs and manufactures weapons and ammunition, such as guns, armor plate, torpedoes, bombs, mines, gunpowder, fuses and the like. The Bureau of Aeronautics is the newest of the bureaus and is in charge of all types of flying vehicles and their equipment. An Assistant Secretary of the Navy has recently been authorized by Congress who coördinates the work of naval aeronautics with that of the Departments of War and of Commerce.

Bureau of Supplies and Accounts handles the finances of the Navy, pays the personnel, both civil and military, and makes all contracts. It also feeds and clothes the personnel and maintains the stocks of material for itself and other bureaus which must be kept on hand ready for routine use or for the emergency of war.

Bureau of Yards and Docks has charge of real estate. It designs, builds and maintains roads, shops, offices, hospitals, dry docks and other buildings on naval property. As all its services are rendered for the facilitation of the work of other branches of the Navy, it consults each of them in matters that concern it, and lays out its plans accordingly. All of these Bureaus have funds annually placed at their disposal by Congress which they disburse through the Bureau of Supplies and Accounts.

Judge-Advocate-General.—The legal affairs of the department are managed in the office of the judge-advocate-general. This office is in two sections. The solicitor is at the head of the civil division, which deals with matters of law such as arise in the conduct of business of every great corporation. The military branch supervises the legal part of the discipline of the Navy. All records of courts-martial go before it for review previous to action by the secretary or the President if such is necessary. It supervises the naval prisons.

Navy Secretary's Council.—These various branches of the department are coördinated by the secretary's council, at which the chiefs of bureaus and other officers periodically meet to discuss and arrange for current work. There is, moreover, the general board, composed of certain ex-officio members and officers who have held high commands. This board is charged with the shipbuilding policy of the Navy and is called upon by the secretary for recommendations as to important matters of departmental policy.

OPERATION AND MAINTENANCE

Naval Stations.—The physical work of maintenance of the Navy is carried on at naval stations numbering over two hundred, great and small, including technical schools, hospitals, barracks, shipyards, gun and munitions factories, magazines and depots for stores of all kinds, radio stations, research laboratories, purchasing agencies, etc. These establishments are mostly operated by civilian personnel and are directed from the navy department by the navy yard division under the Assistant Secretary of the Navy. The principal naval stations are each industrially organized under a commandant, who carries on the work of construction, repair and supply of ships according to directions from the responsible bureaus in Washington, who allot him the necessary sum for each task.

Office of Naval Operations accepts ships, men and supplies from the maintenance side of the department and works them up into efficient ships and fleets and uses them in peace and war to carry out the policies of the nation. The head of the office is the ranking officer of the navy, ex-officio. The office is organized in several divisions. The Training Division is in charge of all drills, target practice, steaming exercises and athletics. By a system of competition and observation it maintains efficiency in the fleet. The Office of Intelligence collects at home and abroad information useful to the Navy. It is aided by naval attaches at the American legations abroad who report to the department what is happening there as to naval affairs, and as to the status of the navy of each power. The planning section draws up plans for war under various conditions. Such plans usually go no further than the mobilization of the active and reserve strength, a concentration of force in some suitable locality, arrangements for supply and maintenance of the fleet and a decision as to the objective towards which the combatant effort will be directed. The Division of Material coordinates with the building bureaus to arrange for repairs to ships in active service. The Division of Ship Movements manages the ships and fleets in commission. The Communications Office is in charge of all radio and telegraphic work. There is an Inspection Division and a District Division handling naval matters in different parts of the country, mostly affairs of naval reserves.

Appropriations for the Navy are controlled by the Bureau of the Budget, which has its representative in the Navy Department. After receiving the President's orders, the Budget Officer allots to the Navy Department the sum it is to have for the year. The secretary, in council with the bureau chiefs, then allots to each of them a sum whose total will exhaust the allotment, and a bill is prepared for submission to Congress.

THE FLEET

Classes of Ships.—A few ships take their orders directly from the Office of Operations but the great majority are members of squadrons or fleets. The largest command, known as the United States Fleet, is composed of all types of ships, both combatant and auxiliary, including battleships. cruisers, torpedo boats, and submarines, besides ships for supply, repairs and hospitals. These ships, all under one commander-in-chief, are grouped in appropriate subdivisions under flag-officers who are responsible for drills, maneuvers, efficiency and discipline of their respective commands. Thus the fleet is maintained in readiness for service, for even in peace some detachment may be called on to act in conjunction with the state department in support of the foreign policy of the Administration.

Ship Organization and Functions.—Each ship is under the command of a captain who exercises authority over all on board, subjects himself to the Navy Regulations approved by the President as Commander-in-Chief. The organization for battle is also that for carrying on the daily routine. The ship's company is distributed in "divisions." The Navigator's Division handles the ship as a whole under the orders of the captain. The helmsmen, leadsmen and lookouts compose it. The Engineer's Division is in charge of the steam, electrical and motor machinery. Several Gun and Torpedo Divisions handle the weapons of the ship. There is a Small-arms Division (usually marines) and an Airplane Division for Airplanes. A Fire-Control Division observes the enemy and directs the gun-fire with the help of observers in the airplanes. A Repair Division of mechanics remedies damages in battle. The Surgical Division cares for the injured. A Signal Division communicates with other ships and the rest of the world by radio, visual and sound signals. The Commissary Division provides and cooks all rations. The paymaster of the ship is the commissary and also the general storekeeper and finance officer.

The general work of maintenance and repair is carried on by the different divisions, each of which is responsible for the good order and cleanliness of that part of the ship in the neighborhood of its own battle station. The divisional work of maintenance is supplemented as may be necessary by the mechanics of the ship's company.

MARINE CORPS

Sea and Land Duties.—There is within the Navy an important unit as yet unnamed, the Marine Corps. This is a body of soldiers forming part of the Navy. Marines do sea-duty on board the larger ships. They man part of the ship's battery and form the small-arms division and are a part or all of any landing force that may be sent away from the ship. When serving on shipboard they are an integral part of their ship's company, in no way in excess of the battle complement. The marines not doing sea-duty are organized as an expeditionary force for quick mobilization to seize an advanced base for the Navy in case of war. For this purpose the Expeditionary Force is organized like an army. Other marines on shore are quartered in military posts at the various naval stations, where they do duty as guards. The headquarter organization of the Marine Corps is under a Major-General Commandant, and is much like that of the Army except that it is not so entirely self-dependent. The marines draw their ammunition, small-arms, artillery, and medical service as well as some other services from the naval bureaus.

AVIATION SERVICE

Organization Needs.—It has been suggested to sever the aviation service from the army and navy and make it into an independent branch of the country's armament, and then to combine the three arms of army, navy and aviation in one huge organization of "The National Defense." This project has not commended itself to the responsible authorities of the Government. It is alleged that some of the chief backers of the proposition are certain manufacturers who believe that such a step would increase business for them. However that may be, the air service must always operate in close conjunction with the army or navy as the case may be. Both need it as an important auxiliary to their own work. Moreover, should it be made an independent arm, it would immediately be obliged to organize round itself a military ground force, or a fleet to enable it to operate against the enemy. This happened to the British air force in Mesopotamia, where a considerable army has been made subordinate to the Commanding Air Marshal in order to permit the air force to maintain itself near the hostile area.

Present Status.—There seems good reason to believe that the present status of the air force of the United States as auxiliary to the army and to the navy is better for the national defense than the independence which the air service enjoys in some foreign countries. Aviation is far from equaling the Army and Navy in importance. It must be remembered that in the great war aviation was new, and it owed much of its effectiveness to its novelty, for counter-measures were slow in developing. At present, in spite of all the improvements in aircraft technique, weapons in the air are probably less to be feared than in 1918, although, on the other hand, the air service will be an indispensable auxiliary in the next war, both to the army and navy.

COÖPERATION OF ARMY AND NAVY

Joint Board of Officers.—The Administration does not believe that military efficiency will be increased by uniting the army and navy in one military structure, on account of the added complexity of management which is already sufficiently great. Nevertheless, both army and navy have long been aware that modern war demands a greater measure of coordination than was customary in the past, and steps have been taken to provide for it without merging the two departments. In 1903 the Secretaries of War and of the Navy established a joint board of officers of the two services to coördinate the action of the two services where it seemed desirable. The matters cognizant by this Board and its procedure were revised in 1919. It is without executive authority, but when its recommendations are approved by the Secretaries (sometimes the President must approve) they become effective. The Board has prepared regulations for the joint action of the army and navy and of their air components when coöperating in war. This cooperation is carried further by local joint committees representing Army Corps areas and their corresponding Naval districts which take cognizance of local subjects and report to their respective chiefs as to appropriate action.

Joint Aeronautical Board.—There is a Joint Aeronautical Board to investigate and report to the Secretaries of War and of the Navy upon questions jointly affecting the development and employment of aviation of both services. There is also an Army and Navy Munitions Board which coördinates the plans for acquiring munitions and other supplies needed for war purposes, so that the supply agencies of the two services will not conflict. The organization of the army and navy for joint action under the supreme command of the President as constitutional Commander-in-Chief is thus provided for without resort to centralization by legislation.

THE FUNCTIONS OF THE NAVY

By William Ledyard Rodgers

Rear Admiral, United States Navy

THE NAVY IN PEACE

Trade Rivalry.—It is generally understood that the function of the Navy is to defend the country, but it has a much wider field than merely defense of coasts and territory. Beyond that the navy exists to defend the national policies of the United States. The chief of these policies is that of peace with security as the basis of the national prosperity. The Navy is the insurance of the prosperity of the United States. The welfare of nations, like that of individuals, rests on remunerative labor, on the business cycle of production, distribution and consumption. Everywhere other great manufacturing nations are competing with us for the disposal of their goods.

Foreign Trade Protection.—This foreign trade requires protection. In time of war, goods in transit on the sea with hostile destination have always been subject to attack by belligerents and neutral goods are respected by the warring powers in deference in great measure to the naval strength of the neutral country. For war has always included two methods of attack, by fighting and starvation. When nations go to war, working men are withdrawn from industry and join the army, while at the same time, the requirements of war call for increased production, especially of military supplies. Thus any nation making war on a great scale must depend for much of its supplies upon borrowed money and imported goods. These imported goods which pass over seas to support the war, belligerent navies attack or defend. The country which can keep open its own lines of supply across the seas and throttle those of the enemy has taken a long step towards winning the war. This commerce may be the general commerce supporting the hostile nation or it may be something special which is directly supporting some military effort. Thus the interruption of the line of transports supplying an invading army over seas may bring the army itself to impotence. For the United States when at war, the navy is of supreme importance, as it is only overseas that the country will meet important enemies.

INTERNATIONAL ASPECTS OF DEFENSE

Kellogg Pact.—At the present time, much interest is felt in the Kellogg Pact and there are many who believe that since all the great powers have signed it, implicit reliance can be placed on the protection afforded by its verbal pledge. This idea has not wholly gained the adherence of the government of this country where responsibility for the safety of the nation and the continuance of its prosperity through peace is lodged. The United States is the richest of all countries and is the object of envy to less fortunate ones, but there is no international force to back international law and international pledges. Reliance must be placed on armaments to protect rights, policies, and the law.

The "Open Door."—Particularly the country needs its navy to protect its policy of the "open door" throughout the world. Within the last century the development of steam transportation has made the world an economic unit such as it never was before, yet without dispelling international jealousies and rivalries. The United States, Germany, Great Britain and France are the four chief manufacturing nations of the world which draw the raw products of their industries from the four quarters of the globe and export the products of their factories in exchange. The prosperity of each requires free access to the markets of the world. Once this country relied on England to distribute exports for us; now it is no longer England's client but an economic rival. Our huge exports of manufactured goods compete with hers everywhere. It is vain to hope that England or Germany will continue to carry our ocean commerce without discrimination against our trade.

Freedom of the Seas.—To retain the full measure of prosperity we must reach foreign markets by our own merchant shipping. . . . In peace and war the merchant fleet must be protected by a strong navy. America's century-old stand for freedom of neutral trade during war (the freedom of the seas) has failed to commend itself to the world during all that time and even we ourselves have not observed our own doctrine when this country itself has been a belligerent. As both England and Germany found in the last war, the attack upon ocean commerce is a very potent means of applying force in war; at the same time it is more humane than bloodshed. Merely by asserting neutral right it cannot be hoped to induce a belligerent to renounce attack on commerce; nor can it be hoped to rely upon some international rule for the protection of neutral trade with the enemy in time of war for the methods of war against property are not governed by any true law, but by empiric rules of conduct proclaimed for each war by the belligerents. These rules treat commerce with the enemy with as much severity as may be without driving important neutral nations into hostilities. This gives the belligerents considerable latitude, for no nation will go to war unless very strongly pressed. The respect desired for peaceful trade is best secured by a navy strong enough to make neutrality worth preserving and enmity something to be avoided. A chief function of the American Navy is therefore to serve as a warning to belligerents that neutral American commerce is not to be unduly subject to belligerent interference. It cannot be hoped that our Navy will completely preserve American prosperity during wars for neutral nations will suffer, though indirectly, from the hostilities of other nations. Nevertheless, if the existence of a strong Navy enables us somewhat better to preserve the freedom of commerce on the seas and neutrality with it, the Navy will serve the country well. For this purpose the size of the Navy has been indicated by the President; it must be second to none, for the smaller size would not adequately defend the population, vast wealth and foreign commerce of the United States.

THE NAVY IN WAR

Keeping the Sea Open.—The second function of the Navy is its combatant service when this country is at war. Then the productive power of the country is in great measure diverted to war supplies of every kind and the needs of the people as well as those of the army demand greatly increased importations from overseas. For this the nation needs both commercial shipping and a navy to guard its business in every part of the world. But it is as important to strike at the enemy's commercial and military traffic on the seas as it is to defend our own. . . . The duty of the navy is, therefore, to debar the enemy from the use of the sea either for military or civil transportation and to keep the sea open for our own use.

Coast Defense.—The third function of the Navy is that of coast defense. It is substantially accomplished by a fleet adequate for commerce protection, but undoubtedly, it would be imprudent not to provide local naval defense in addition to harbor fortifications. For this purpose submarines are particularly suitable.

Considerations of Naval Strength.—The question naturally arises what is the proper size of the navy to accomplish these defensive functions? President Wilson in 1916 adopted as a policy that the American navy should be second to none, and successive administrations have adhered to this position. Until 1900 Great Britain was the leading nation in the world and depended on her sea power to hold that leadership. Now the United States has replaced her in world leadership and Great Britain seems loth to admit that this country through her population, wealth and world trade requires equal naval strength as an insurance against aggression. Hence the difficulty about agreeing on a limitation of naval strength. Great Britain wishes for superiority to preserve her old dominance; this country insists on parity to protect international trade from dominance by any other nation which may chance to be at war. The Kellogg Pact which renounces war as an instrument of national policy has yet to prove its efficacy since it would seem that no nation can pledge future generations any more than an individual can pledge his children. Conditions change and men change their views. The Kellogg Pact serves the purpose of tending to stabilize friendly international relations. The United States is the most conservative great power at the present time; it has most to hope for from the peace of the world and least to hope for from war. In these conditions, a great function of the American Navy from now on is to stabilize the Kellogg Pact by making it inadvisable for other nations to resort to war as an instrument of national policy.

NAVAL CONSTRUCTION AND EQUIPMENT

By Peter Bain

Editor, *Shipping Illustrated*

NAVAL FACTORS IN 1929

A marked revival of interest and activity in naval affairs developed early in 1929 and, due to a later fortuitous series of events and circumstances, that projected themselves into the already initiated movement, the close of the year found us, as indeed all leading naval powers, very much navy-conscious. Chief among the contributing factors were the determination to increase the defensive status of our fast light cruiser fleet; an apparent world-wide desire that the burden of naval armament of all classes and types should, at least, be eased; the comparative imminence of a rewriting of the Washington Naval Disarmament Treaty of 1921; a growing dissatisfaction with the unfortunate outcome of the later Geneva Conference relative to fast light cruiser limitation; the visit here of Britain's Prime Minister; his informal talks on naval disarmament with Mr. Hoover to that end, and their decision to call the leading naval powers together in conference in London Jan. 21, 1930. Scope of the Conference is unrestricted and much difference of opinion exists among the conferees on various aspects of degree and type limitation, as also on the matter of national ratios. In consequence, duration of the deliberations may well extend over three or four months. Nations participating in the Conference are the United States, Great Britain, France, Italy, and Japan. Pending outcome of the Conference, progress will be in large part halted on new construction authorized by Congress in February, 1929. King George opened the Conference in the Royal Gallery of the House of Lords, welcomed the delegates to London and expressed his warm desire for the success of their labors.

COMPLETED AND PROJECTED CONSTRUCTION

River Gunboats.—Under the heading of new construction, in conformity with the Washington Disarmament Treaty of 1921, capital ships are still missing. During the fiscal year ended June 30, 1929, three river gunboats were delivered for service in Chinese waters, thereby completing the total of six such craft authorized by the Act of Dec. 18, 1924. These vessels, the *Guam*, *Tutuila*, *Luzon*, *Mindanao*, *Panay* and *Oaku*, were built by the Kiangnan Dock & Engineering Works, Shanghai, China. All completed their trials successfully and such minor defects as developed as a result of the first six months' service were remedied by the builder as required by the terms of his contract.

Under Construction and Ordered.—Although no new construction had been undertaken, there still remained 10 uncompleted vessels carried over from the previous year, consisting of light cruisers and 2 fleet submarines. It should be noted, however, that bids from merchant ship builders and estimates from navy yards for the construction of light cruisers Nos. 32 to 36 were opened and awards made on July 12. These vessels constitute the first group of 5 of the 15 light cruisers authorized by the Act of Feb. 13, 1929. Bids from private shipyards were considered only for Nos. 33 and 35, although the construction estimates from navy yards applied to all five vessels.

Light Cruiser Construction Awards.—Formal awards were made as follows: No. 32 to the New York Navy Yard; No. 33 to the Bethlehem Shipbuilding Corporation, Quincy, Mass.; No. 34 to the Puget Sound Navy Yard; No. 35 to the New York Shipbuilding Corporation, Camden, N. J., and No. 36 to the Philadelphia Navy Yard. Contracts No. 33 and 35—those allocated to private shipyards—call for completion by Aug. 15, 1932. Of the three allocated to navy yards, it is estimated that No. 32 will be completed by November, 1932; No. 34 by February, 1933; and No. 36 by August, 1933. Contractors for Nos. 33 and 35 are furnishing their own working plans, while plans for the three vessels to be built by navy yards are being prepared by a central drafting office in the New York Navy Yard. Approved working plans for Nos. 33 and 35 will be used for the navy yard cruisers as far as applicable. The main propelling machinery for the latter will be supplied by the Westinghouse Electric and Manufacturing Co. It will be of the same general type, although differing in detail design from the installations of Nos. 33 and 35.

LIGHT CRUISERS

Launchings and Completions.—Eight light cruisers were authorized by the Act of December 18th, 1924. The first two of these—the *Pensacola,* and the *Salt Lake City*—built respectively by the New York Navy Yard and the New York Shipbuilding Corporation, were completed before the close of 1929, the *Salt Lake City* being commissioned Dec. 11. Commissioning of the *Pensacola* was expected to take place later in that month. Propelling machinery for both was manufactured by the American Brown, Boveri Electric Corporation, Camden, N. J. The remaining six vessels are of the same design except for minor differences in quarters, three being equipped as Force flagships and three as Division flagships. Three, the *Chester, Northampton,* and *Houston* are due for completion by June 13, 1930. All of the three were launched from private shipyards in the latter half of 1929. The three remaining vessels of the group, the *Louisville, Chicago* and *Augusta,* are due for completion by March 13, 1931. The *Louisville* is building at the Puget Sound Navy Yard, the *Chicago* at the Mare Island, and the *Augusta* at Newport News. Leading particulars of all of the eight light cruisers referred to in the foregoing are: Displacement tonnage, 10,000; length over-all, 585 ft. 6 ins.; and beam, 65 ft. 3 ins. All are oil-fired and geared steam turbine propelled through quadruple screws. The *Pensacola* and *Salt Lake City* are of 32.5 knots speed, and mount a main battery of ten 8-inch guns and an anti-aircraft battery of four 5-inch guns. The *Chester, Northampton, Louisville, Chicago, Houston* and *Augusta,* are of 32.7 knots speed, and mount main batteries of nine 9-inch guns and anti-aircraft batteries of four 5-inch guns. The 10 light cruisers at present in commission are of 7,500 tons displacement, 555 feet, 6 ins. length over-all, 55 feet beam and from 34.2 to 34.9 knots speed. Their main battery equipment consists of twelve 6-inch guns, and that of their anti-aircraft battery, of four 3-inch guns.

SUBMARINES

Early in the past fiscal year, the mine-laying fleet submarine *V-4,* for operating in distant waters as required, went into commission. In the interval it has been associated with fleet operations generally. The *V-4* was constructed at the Portsmouth Navy Yard and its machinery equipment supplied by the New York Navy Yard. Two cruiser type fleet submarines the *V-5* and *V-6*, are under construction, one at the Portsmouth Navy Yard and the other at the Mare Island Navy Yard. They constitute the largest undersea vessels yet built for the United States Navy and will be among the largest constructed by any nation. The largest submarine in existence is *Le Surcourf,* of the French Navy, launched at Cherbourg in November, 1929. *Le Surcourf* is 426 feet long, and has a displacement of 3,256 tons on the surface and 4,304 tons submerged. Her speed will reach 19 knots. The largest British submarine is the *X-1,* placed in commission Sept. 25, 1925. Her displacement is 2,700 tons normal surface, and 3,600 tons submerged. She is 350 feet long, has a maximum speed of 19.5 knots, and cost with alterations $5,074,600.

The *V-5*, launched from the Portsmouth Navy Yard Dec. 17, is the fifth of a group of nine submarines authorized by Congress in the 1916 building program. The earlier units, *V-1, V-2* and *V-3* were designed for higher speed but for operation within restricted areas. Except for some of the larger pieces of electrical apparatus, the *V-5* is entirely a Navy product. She was designed by the Navy Department and is powered with engines constructed at the New York Navy Yard. The hull and most of the auxiliary machinery and a large part of the electrical equipment were constructed at the Portsmouth Navy Yard. The *V-5* is 371 feet long, 33 feet 3 inches beam and has a standard surface displacement of 2,760 tons, with a corresponding mean draft of 15 feet 11 inches. This is the Washington Treaty standard displacement, which excludes fuel oil. Her operating surface displacement therefore will be somewhat greater. Commissioning of the *V-5* is planned for May 29, 1930, and completion of her preliminary trials on August 1. Work on the *V-6* is normally about 3 months behind that on *V-5*.

PLAN AND SPECIFICATION ACTIVITIES

Preliminary studies have been undertaken relative to determination of the characteristics of the second group of five light cruisers authorized by the Act of Feb. 13, 1929. For the airplane carrier authorized by the same Act, contract plans and specifications were completed, as were those also for fleet submarine *V-7*. The preparation of contract plans and specifications for fleet submarines *V-8* and *V-9* awaited decision as to the type of propelling machinery to be installed. Preliminary plans were completed of a salvage vessel for submission to Congress as called for by the Act of February 13th, 1929. Relative to battleships already in commission, plans and specifications were completed and issued to the Philadelphia and Norfolk Navy Yards, respectively, for modernization of the *Pennsylvania* and *Arizona*. With their completion on March 1, 1931, ten of our 13 pre-Jutland battleships in service will have been modernized. Preliminary studies along the lines approved for the *Pennsylvania* and *Arizona* also were made for modernization of the *New Mexico*, *Mississippi* and *Idaho*, though not yet authorized by Congress.

Plans were under preparation of two designs for 40 ft. motor launches with a view to providing boats that would be suitable not only for ship use but better adapted for landing operations than the existing standard boats. Plans were also prepared for a 60 ft. drag boat for survey work and, from them, two such craft were constructed and placed in commission. Six 26-ft. knockabout boats of a new design are being built for the use of the Naval Academy in the instruction of midshipmen. A 40 ft. self-propelled landing lighter for troops and a 45 ft. artillery landing lighter were completed. Preparation of general arrangement plans for the conversion of merchant vessels to naval auxiliaries proceeded uninterruptedly during the year, progress being made also in the preparation of type specifications and allowance lists for such conversions. A series of small scale tests were started at the Washington Navy Yard to check the present method of calculating the strength of submarine hulls. Results of the investigation are expected to be of considerable value.

EXPERIMENTAL TANK

As indicative of the demand for and value of model tests, out of a possible total of 302 days, the experimental tank at the Washington Navy Yard was in use for 279 of these. A total of 118 models were tested, of which 25 were run self-propelled. Of the total, 67 were ship models—38 for the Bureau of Construction and Repair and General Research, and 29 for private account. Fast motor boats for private interests accounted for 9 models, while 42 were models of airplane hulls or floats, 17 of which were for the Bureau of Aeronautics and 25 for private account. A new friction plane of 80 ft. length was made and tested. A sectional model of 110 ft. total length was also made but remained untested through press of other work. Satisfactory agreement was also reached between the trial results and model predictions relative to the airplane carrier *Saratoga* and the fleet submarines. In view of the fact that the demand for model tests is increasing at a quite rapid rate, suggestion has been made that a new basin of greater length be provided to take care of the high speeds required for models of aircraft hulls and floats, and an additional new basin of greater length of run be provided for ship model tests.

SUBMARINE PROTECTIVE DEVICES

The board of technical experts appointed by the Navy Department on authority of the President for the purpose of making an independent study of the several thousand suggestions received for devices intended to improve the safety, or facilitate the salvage, of submarines, completed its investigation and made a final report under date of March 22, 1929. Of the changes and additions recommended the preliminary investigation has been completed on the following items and they are being installed on all submarines in commission as rapidly as the vessels become available for the work: Valves for supply and evacuation of air to individual compartments, single-action water-tight doors in the main compartment bulkheads, quick-operating door latches, alterations to hatches to permit escape of the crew from either end compartment, provision of submarine escape appliances and stowage therefor, addition of range lights for navigational purposes, stowage of emergency provisions and fresh water in each compartment, and improvement in water-tight integrity of main bulkheads by the redesign of ventilation valves. Trial installations of preliminary investigation of other items recommended are proceeding.

AUTHORIZATIONS AND APPROPRIATIONS

Naval Stations and Bases.—A Naval Shore Construction Bill calling for an expenditure of $10,077,500 for improvements at naval stations along the continental coasts in Hawaii and the Panama Canal Zone was approved Dec. 19, 1929, by the House Naval Committee. The committee also made public the Naval General Board's recommendation that Camp Kearney, Calif., be selected in preference to Sunnyvale, Calif., as the site for the West Coast airship base where the Navy plans to house one of its giant dirigibles being built at Akron, O. Under the construction measure, Pearl Harbor, Hawaii, would be allotted $1,700,000 for waterfront and channel improvements, $390,000 for buildings at the submarine base, and $249,000 for torpedo storage at the naval air station. San Diego station under the construction measure would be allotted $425,000 for a floating dry dock, $550,000 for a naval air station, and $421,500 for a training station.

Light Cruisers.—Congress is preparing to appropriate money for the completion of all five of the light cruisers Nos. 32 to 36, but is expected to make reservations to modify the program if that be necessary to conform to any decisions reached at the London Conference. Construction of cruisers Nos. 33 and 35 is already under way in private yards but, under Navy Department plans, keels of Nos. 32, 34 and 36 will not be laid until after the Conference. Meantime preliminary work is provided for in the Budget submitted to Congress by President Hoover. All five cruisers will be provided with the latest type of fire control and defensive batteries against attack by airplanes.

NAVAL AERONAUTICS

By W. A. Moffett

Rear Admiral, U. S. N.; Chief, Bureau of Naval Aeronautics,
Navy Department

PROGRESS

Building Program.—Naval aviation progress during the past year has continued to demonstrate the wisdom and soundness of the Navy's Five Year Building Program as authorized by Act of Congress approved June 24, 1926. Progress towards the accomplishment of this program is continuing satisfactorily and it is important that it be completed as authorized, on time and without material changes.

Planes and Flying Hours.—During the year, naval aviators flew a total of 205,421 hours. The average pilot flew about 216 hours or about 19 per cent more than in the previous year. In the Fleet approximately 285 planes were being operated. Scouting, torpedo and bombing, observation, and fighting planes were carried on the *Lexington, Saratoga* and *Langley;* and fighting and observation planes were operating from catapults on the battleships, while each light cruiser operated two observation planes.

AIRPLANE CARRIERS

Mimic Warfare Operations.—The year opened with the Fleet's annual cruise in southern waters, participated in this year for the first time by the two carriers, *Saratoga* and *Lexington.* Together with the battleship and cruiser planes, the carrier planes demonstrated every possible form of offense against surface craft and shore bases. Torpedo planes delivered attacks through smoke screens, fighting planes delivered attacks on surface vessels and shore stations, while radio-equipped observation planes kept the ship constantly informed of all phases of the "war." A night air raid sent out by one of the carriers while she was yet 150 miles off the coast of Panama, theoretically destroyed the locks. Two hundred and forty-seven (247) planes took part in the maneuvers and flew 4397 hours over nearly half a million miles in every kind of weather and under varying conditions, without a single serious accident.

Carrier Tonnage.—The authorization of an additional aircraft carrier evidences Congress's realization not only of the need for, but of the expediency of, this type of tonnage in the Fleet. However, there is still an urgent need of additional carrier tonnage to provide for the expansion of the air arm in accordance with its proportionate relationship to the Fleet as a whole, and in order to provide the parity of aircraft carrier tonnage allowed in the Washington Limitation of Armaments Treaty.

AIRCRAFT FORCE AND PRODUCTION

Types and Testing.—The Navy now has on hand or in production aircraft suitable for carrying out any mission which the forces afloat may be called on to accomplish. There are two new types of fighters being produced and a third type being experimented with; deliveries are being made on a large order for a modification of the present type of observation plane, while two new experimental types are under test; a modification of the standard torpedo and bombing plane is in production and several experimental types are being tested; development of the patrol type program, along both monoplane and biplane lines, is proceeding satisfactorily; of these, 55 airplanes have been contracted for on the basis of the development of the biplane, *PN-12,* and a small production order placed for monoplane patrol boats similar to the *XPY-1.*

Engines.—To provide all types of planes with suitable power plants, aircraft engine development has been stressed particularly on the score of increased reliability along with further reductions in weight, factors mandatory in the design and construction of naval aircraft because of the limitation imposed by shipboard operating conditions. The air-cooled engine ranging in power from 200 to 600 horsepower is standard in all types of Navy planes.

Personnel.—The situation regarding qualified aviation pilots continues to be acute. During the past year some progress has been made toward relieving this personnel shortage by increasing the number of officers and enlisted men assigned to training at Pensacola, but the shortage still remains and constitutes one of the most serious problems facing Naval aviation. The large present demand from commercial organizations for Navy trained pilots and technicians adds seriously to the attrition and difficulty of securing adequate members.

FLOOD RELIEF WORK

During the flood of March 14, 1929, in which a number of towns in southern Alabama and west Florida were inundated aircraft from the U. S. Naval Air Station, Pensacola, afforded very valuable assistance in carrying food, clothing, and medical supplies, maintaining communications, and in performing other services in connection with flood relief work. While engaged in this work Naval aircraft made 113 flights and flew a distance of approximately 15,000 miles.

New Airships.—With the order for two new 6,500,000 cu.ft. airships well under way and a program outlined for the establishment of a new airship base on the west coast the future naval lighter-than-air work for the next two or three years is fairly well defined. The estimated delivery date for the first of these airships is June, 1931, and when completed, will be the largest in the world. Rigid airship operations have continued throughout the year and steadily increasing progress has been made in solving the problems connected with airship handling.

Experimental Work.—An experimental Mobile Stud mast has been completed and a number of towing tests conducted. These tests indicate the ultimate feasibility of an airship handling scheme, which is built around the Mobile mast as the principle mechanic unit. An apparatus for attaching airplanes to airships has also been constructed and preliminary trials successfully carried out. During the year the *Los Angeles* made 36 flights during which time it was under way 640 hours. Two extended flights were made—one to Fort Worth, Texas, and the other to St. Josephs, Florida. The Florida trip made by the *Los Angeles* included tactical operations and exercises with the mooring ship *Patoka.*

NAVAL EDUCATION

By Carroll Storrs Alden

Head of Department of English, U. S. Naval Academy

EDUCATIONAL REQUIREMENTS

Extremely few officers or men now remain in the Navy who have handled a sailing ship. The days of the marline spike and belaying pin are past, and most of the laborious tasks of the naval vessel are performed by machinery. These and also mechanical devices which have improved gunnery, torpedo firing, engineering, navigation, and communication, all require specialists. If this is true of the battleship, cruiser, and destroyer, it is not less of the submarine and airplane. Officer and enlisted man must have, not only a general naval education, but special schooling or preparation for most of the assignments.

NAVAL AVIATION

Growth of Service.—Aviation, the youngest branch of the Navy, and unquestionably the one that has most firmly gripped the public, occupied for some years a doubtful position in the service. In 1911 there were three naval aviators; in 1916, when this country was on the verge of the World War, there were but nine fully qualified. Now in the Battle Fleet alone there are sixteen squadrons of airplanes with a total of 225 planes. In operations at sea, when early in 1929, the Fleet had concentrated for maneuvers, the planes spent 5,708 hours in the air, flying a total of 486,282 miles. Their landings, which had to be made on the carriers' decks, numbered 2,409.

Airplane Training.—Naval aviators receive their airplane training at the Naval Flying School at Pensacola. The preliminary examination given to officers before being selected for this training is exacting, and many are eliminated here as well as later in the course. It is only after nine months of training and about 240 hours of flying that they receive their designation as naval aviators. As yet this system is not supplying aviators in such numbers as are required, and the Navy is considering plans for increasing the output.

SPECIAL EDUCATION FOR ENLISTED MEN

Enlisted men, as truly as the officers, require special education. The number of first enlistments in 1928 was 17,002, about 28 percent of the men afloat. More than 50 percent of the recruits had completed all or part of a high school course, and their average age was less than nineteen. This means that few had learned a trade and that a still smaller number had seen any service at sea. On enlistment all are given a general training of nine weeks at one of the four large stations,—Hampton Roads, Newport, Great Lakes, or San Diego. They are constantly subject to scrutiny, and opportunity is given to those who show aptitude to try for one of several Service schools such as are constantly training musicians, radio operators, electrician's mates, hospital corps, aviation general utility men, machinist's mates, blacksmiths, boilermakers, etc. Instruction for those that qualify varies, according to subject, from twelve weeks to nine months. In addition to this, the Navy offers to men afloat or ashore what is similar to correspondence courses. During the past three years fifty-eight rating courses were printed and supplied, and eighty-four general educational courses were prepared and sent out. Though study for enlisted men is optional, it has been difficult for the Navy, with the limited funds for this work, to keep up with the demand. Taking advantage of their opportunities, men who have had no previous experience have become electricians, machinists, radio operators, painters, coppersmiths, aviators, etc.,—of greatest value to such as are ambitious for advancement in the Navy or in civil life at the end of their enlistment.

MARINE CORPS TRAINING

The Marine Corps, with an approximate strength in 1929 of 18,000 has 2,000 aboard ships of the Navy, 1,000 attached to Marine Corps air squadrons, 6,000 serving ashore outside the continental limits of the United States, and the remainder at their home stations. For nearly all there is constant drill in landing operations, and in the handling of small arms and ordnance of small caliber. All second lieutenants must attend the Basic School at Philadelphia. Ranking officers, as they can be spared, are detailed to the Naval or Army War College and to the Army Command and General Staff Schools.

EDUCATION OF NAVAL OFFICERS

Requirements and Courses.—In the education of officers, the Naval Academy does the bulk of the work. Over 2,000 midshipmen were in attendance at Annapolis at the beginning of the academic year 1929-30. The mental requirements for admission are about the same as those of the colleges, and are what a good high school can meet. They presuppose three years study of Mathematics, three years of English, Physics, American History, Ancient History, etc., but no Latin or foreign language. The course is four years, with two of the summers occupied by practice cruises on battleships selected from the fleet. The Second (Junior) Class was for the first time during the summer of 1929, given practical instruction in aviation at the Academy instead of being sent on the cruise, each midshipman in addition to ground instruction spending several hours in the air and being required to perform almost every duty except handling the controls. On graduation most midshipmen are commissioned ensigns in the line or staff corps of the Navy, or second lieutenants in the Marine Corps.

Naval Reserve Officers' Training Corps units under the direction of officers detailed for the purpose are being successfully continued at Harvard, Yale, Georgia School of Technology, Northwestern, California, and Washington. The naval course is elective, and students completing it are given credits for their degree and are offered commissions in the Naval Reserve.

Special Schools. — Commissioned officers in as large numbers as is practicable are detailed to attend special schools, such as those of aviation—heavier-than-air craft at Pensacola, lighter-than-air craft at Lakehurst—, of the submarine at New London, and of the torpedo at Newport.

Postgraduate instruction, with the first year at the Postgraduate School of the Naval Academy at Annapolis and the second year (and in a few subjects also a third year) at one of the universities or at the Naval War College, is being extended each year. Instruction is given in such fields as engineering (civil, mechanical, electrical, radio, communication, etc.), ordnance, naval construction, and duties of the general line.

The Naval War College at Newport gives a senior and a junior course, each a year in length, the object being to train officers for command, or for the staff of officers that command. The work of the college is carried on by the Intelligence Department and the Operating Department—the former relying largely on lectures, and the latter making use of the applicatory method. In their war games, involving strategy, tactics, and logistics, the commanding officers of units ranging all the way from the fleet to the destroyer or submarine are student officers, and the umpires are the staff officers of the college.

COGNATE SOCIETIES

SERVICE SOCIETIES

American Legion, 777 No. Meridian St., Indianapolis, Ind.
American Remount Association, 810-18th St., N. W., Washington, D. C.
American Signal Corps Assn., 195 Broadway, New York, N. Y.
Army and Navy Union, U. S. A., 315 Hazen Bldg., Cincinnati, Ohio.
Association of Military Surgeons of the United States, Army Medical Museum, Washington, D. C.
Chemical Welfare Service, Edgewood Arsenal, Maryland.
Military Training Camp Assn., 19 W. 44th St., New York, N. Y.
National Guard Assn. of the U. S., 32nd St. and Lancaster Ave., Philadelphia, Pa.
Navy League of the United States, 1749 E. St., N. W., Washington, D. C.
Pennsylvania National Guard, 32nd St. & Lancaster Ave., Philadelphia, Pa.
Quartermasters' Assn. of the U. S., 923 15th St., N. W., Washington, D. C.
Reserve Officers' Assn. of the U. S., 1653 Pennsylvania Ave., N. W., Washington, D. C.
Society of American Military Engineers, 810 Mills Bldg., Washington, D. C.
Society of Naval Architects & Marine Engineers, 29 W. 39th St., N. Y. C.
U. S. Army Ordnance Assn., 806 Mills Bldg., Washington, D. C.
U. S. Cavalry Assn., 1624 H St., N. W., Washington, D. C.
U. S. Field Artillery Assn., 1624 H St., N. W., Washington, D. C.
U. S. Infantry Assn., 1115 17th St., N. W., Washington, D. C.
United States Naval Institute, Annapolis, Md.

PATRIOTIC AND HEREDITARY

Colonial Dames of America, 421 E. 61st St., New York, N. Y.
Daughters of 1812 U. S. National Society, 108 Iona Ave., Narberth, Pa.
Daughters of the American Revolution, Memorial Continental Hall, Washington, D. C.
Daughters of the Revolution National Society, 420 Lexington Ave., New York, N. Y.
Grand Army of the Republic, Room 3, City Hall, N. Y. C.
Military Order of Foreign Wars of the U. S., 149 Broadway, New York, N. Y.
Military Order of the Loyal Legion, 140 Nassau St., New York City.
Military Order of the World War, 52 Vanderbilt Ave., New York City.
National Security League, 45 West 45th St., New York City.
National Society of the Sons of the American Revolution, 1227 16th St., N. W., Washington, D. C.
National Society of Sons of the Revolution, Princeton University, Princeton, N. J.
Order of Founders and Patriots of America, 111 Broadway, New York City.
Pilgrim Society, Pilgrim Hall, Court St., Plymouth, Mass.

Society of Colonial Wars, 124 E. 58th St., New York City.

Society of the Cincinnati, 136 W. Lanvale St., Baltimore, Md.

Society of Mayflower Descendants, 120 E. 71st St., New York City, New York.

Sons of Confederate Veterans, Law Bldg., Richmond, Va.

Sons of the American Revolution, National Society, 1227-16th St., N. W., Washington, D. C.

Sons of Veterans, Reading, Pa.

Spanish-American War, Navy and Military Order, 184 State House, Boston, Mass.

United Confederate Veterans, New Orleans, La.

PART FOUR
ECONOMICS AND BUSINESS

DIVISION X
BUSINESS AND FINANCE

GENERAL BUSINESS CONDITIONS

By S. S. Huebner

Wharton School of Finance and Commerce, University of Pennsylvania

---

COMMERCIAL BAROMETERS

Year's Average Business Unchanged.—With comparatively few exceptions, business conditions during the first nine months of 1929 reached a somewhat higher level than that of the corresponding period of 1928. The last quarter of the year, however, witnessed a sensational collapse of security market prices with its attending effects upon business conditions. Taking the year as a whole, the average of 1929, as indicated by leading business barometers, is about the same as that of the previous year, with conditions at the close of the year slightly below normal.

Check Transactions.—A review of the various barometers of business clearly indicates a high level of business activity during the first nine months of the year. Check transactions during the first nine months of 1929 exceeded those of the same months in 1928 by nearly 19 per cent, whereas those of 1928 exceeded the 1927 total by over seventeen per cent.

Stock Market Transactions.—The volume of stock market transactions during 1929 was phenomenal and unprecedented, shares traded in on the New York Stock Exchange exceeding 1,125,000,000 shares, as compared with the previous high record of 919,661,000 shares in 1928 and with the pre-1928 record of 576,563,000 shares during 1927. Railroad shares (using the Babson average) reached the highest price level (in September) since 1921, namely 189.11 as compared with an average high of 144.24 for all of 1928. Industrial shares also reached the highest level in September, namely 381.17 as compared with an average high of 234.89 for all of 1928. Copper shares also reached a monthly average of 80.7 in September, as compared with the previous 1928 average of 52.7. In all of these groups, however, the collapse was sensational following the September high prices, as is explained in the section dealing with the security market.

Brokers' Loans.—Brokers' loans reached unheard of figures during the first three-quarters of the year, namely from $5,982,000,000 in January to $7,831,000,000 in September, as compared with $3,392,000,000 in January of 1928 and $2,328,000,000 in January of 1927. Following the stock market collapse, these loans were reduced sensationally to $3,297,000,000 at the close of November, *i.e.* the total was practically cut in half.

Money rates for demand loans reached a monthly average during September of 8½ per cent, and for time loans of 6½ per cent, as compared with the corresponding averages in 1928 of 6¾ and 5¼ per cent.

CONDITIONS IN LEADING INDUSTRIES

Retail Trade.—Most of the indices of trade will be referred to under the heading of "Resumé of Leading Indices of Trade" and "Index Numbers." But passing reference should also be made to business conditions prevailing in the leading groups of industries not chronicled in the commonly used indices of trade. According to the Alexander Hamilton Institute reports on business conditions (Nov. 9) retail trade in September, as indicated by the sales of 523 department stores, showed an increase of 1.9 percent over a year ago, and for the first nine months of 1929 sales exceeded those of the corresponding period in 1928 by 2.8 percent.

Sales Volume.—In most other lines of business a substantial gain is apparent during the first three-quarters of the year as compared with 1928. Using the latest availing production figures in ten leading industries (*Babson's Reports*) the showing is as follows: automobiles and trucks, (August, 1929) 499,629, as compared with 461,298 for August, 1928; gasoline (bbls. August) 35,510,000 as compared with 34,037,000 in 1928; pneumatic tires (No. July) 4,834,000 as compared with 4,881,000; copper (lbs. Sept.) 157,330,000 as compared with 154,170,000 in 1928; steel ingots (tons, Sept.) 4,510,879 as compared with 4,147,000 in 1928; bituminous coal (tons Sept.) 44,515,000 as compared with 41,401,000; lumber (bd. ft. Aug.) 22,459,000 as compared with 20,073,000 in 1928; cement (bbls. Sept.) 17,223,000 as compared with 17,884,000 in 1928; boots and shoes (No. pairs, Aug.) 36,295,389 as compared with 34,974,115; and cotton consumption (bales, Sept.) 545,649 as compared with 492,221. In almost all cases the volume of business during the previous months of 1929 was substantially larger than that for the corresponding months of the previous year.

Changes in Major Lines.—The same tendency is also true in most other lines of business, with however, a reversal in the latter part of the year. In its January (1930) report on "General Business Conditions," the National City Bank indicates as follows the changes for November and for the first 11 months of 1929 as compared with the corresponding periods of 1928.

Industrial	*Percentage Change* 1928-1929 *November*	*11 Months*
Copper shipments	— 28.3	+ 5.9
Rubber consumption	— 26.2	+ 8.8
Sugar meltings	— 25.4	+ 1.6
Pine lumber shipments	— 20.8	— 5.1
Automobile production	— 20.0	+ 25.8
Steel ingot production	— 17.7	+ 11.8
Anthracite coal production	— 17.5	— 0.4
Zinc shipments	— 16.3	— 0.4
Cotton consumption	— 11.0	+ 9.3
Lead shipments	— 10.0	+ 4.8
Tin deliveries	— 7.7	+ 16.3
Cement shipments	— 6.2	— 2.7
Newsprint shipments	— 5.7	+ 1.2
Bituminous coal production	+ 0.4	+ 8.8
Machine tool shipments	+ 3.7	+ 43.3
Silk deliveries	+ 6.0	+ 9.9

Building Construction.—In the field of building construction, however, conditions were not so satisfactory. Last year's discussion called attention to the retrocession in this important field, owing to the fact that the new building supply had outstripped the demand. As regards new buildings started (*Babson's Summary* of the F. W. Dodge Corporation reports, representing three-quarters of the nation's population) in September, 1929, the total is only $397,355,000 as compared with $520,731,000 for the same month in 1928. For the first nine months of the year the total is only $3,983,000,000, as contrasted with $4,507,000,000 for the corresponding period of 1928.

RESUMÉ OF LEADING INDICES OF TRADE

Trends.—A brief resumé of the leading indices of trade for the major part of 1929, aside from the financial and security market indices, already referred to in another section of THE AMERICAN YEAR BOOK, will also serve to show that, with few exceptions, business conditions during the first nine months of 1929 were above normal, and in excess of the 1928 level. But later figures, when obtainable, will indicate a considerable recession during the last quarter of the year.

Capital Financing and Dividends.—New capital financing for the nine months of the year totaled $7,400,757,000 as compared with only about half that figure for the corresponding 1928 period, namely $3,780,563,000. Industrial dividend payments (*Babson's Reports*) are reported for the first ten months of the year at $1,712,800,000 as compared with $1,425,380,000 for the same period in 1928. In fact the ten months period exceeds the 1928 twelve months total of $1,685,050,000. Railroad and traction dividends for the first ten months of 1919 (*Babson's Reports*) are placed at $469,700,000 as compared with $422,430,000 for the same period in 1928.

Exports and Imports.—Exports of merchandise during the first nine months of 1929 were the highest on record for that period since 1921, amounting to $3,849,218,000, and exceeding those of 1928 for the same period by over 8 per cent. In the case of imports of merchandise there was also an increase, the total standing at $3,361,833,000, or an increase of over 9 per cent.

Pig iron production for 1929 (9 months) totals 32,648,000 tons as compared with 27,793,000 for 1928, or an increase of over 17 per cent.

Freight Loadings and Railroad Earnings.—Average weekly revenue freight car loadings for the first nine months stood at 1,021,231 as compared with the 1928 average for the same period of 977,294. Gross and net railway earnings also registered considerably better for the first eight months (latest figures available) i.e. gross earnings were $17,400 per mile in 1929 as against $16,497 in 1928, and net earnings $4,873 as against $4,209 for the preceding year.

Business Failures. — Reference should also be made to the 1929 record of business failures. As compared with 1928, the first nine months of 1929 show a slightly smaller number, namely, 16,041 as contrasted with 16,742. But the liabilities involved total nearly $399,000,000 as compared with the 1928 nine months figure of $373,000,000.

INDEX NUMBERS

Retail Prices.—Last year's discussion called attention to the declining tendency in commodity prices, and the causes therefor. This year's tendency (for the first ten months) is similar, if we may judge from Bradstreet's Index of Wholesale Prices. But as was the case last year, the tendency has been moderate and very gradual. The first ten months average for 1929, using this index number, was 12.7435, as compared with 13.3227 for the same period of 1928, or a decrease of 4.4 percent. The 1929 Bradstreet's Index Number of 12.7435 should be compared with 18.6642 for 1919, showing a decline of nearly thirty-two percent.

Wholesale Prices.—The same tendency also occurred with respect to outstanding wholesale commodities. Thus, on the basis of Babson's Index Number of Wholesale Prices covering the basic commodities of hides and leather, print cloth, petroleum, iron and steel, rubber, paper, wool, building materials, non-ferrous metals and bituminous coal, the average price level of 1929 (first 8 months) stood at 150, as compared with the corresponding levels for 1928, 1927 and 1926 of 155, 155 and 174.

The price and volume of labor also disclosed an increase as compared with 1928, as far as the first three quarters of the year are concerned. At the close of 1928 (av. for Dec. using mfg. estimates published by the N. Y. State Dept. of Labor) employment stood at 95 and the payroll at 98. Both figures were substantially higher for 1929 as regards all months except January. For September the figures stood at 100 and 106 respectively.

THE SECURITY AND MONEY MARKETS

By S. S. Huebner

Wharton School of Finance and Commerce, University of Pennsylvania

GENERAL CONDITIONS

Stock exchange transactions during 1929, as also in 1928, set a record. Moreover, as explained in previous issues of The American Year Book, 1927, 1926 and 1925 represented in each instance the high record in that time. Dividend increases and stock distributions were exceedingly numerous and large, and market sentiment was unusually optimistic during the first nine months of the year. Price levels for all leading groups of stocks reached extraordinary heights. In fact, the bull market of 1929 attained to unprecedented proportions both with respect to volume of transactions and appreciation in prices. Following September, however, a nation-wide stampede to unload securities occurred, with the result that all organized markets suffered a collapse likewise of unprecedented proportions.

THE COLLAPSE IN THE STOCK MARKET

For abruptness and extent the collapse was probably the greatest in the history of the stock market. The ticker was frequently hours behind in its quotations. Oct. 24 sales on the New York Stock Exchange totaled 12,894,650 shares, as compared with the previous daily record (also in 1929) of 8,200,000 shares, while on Oct. 29 the daily record for all time was established,—16,410,000 shares. During October the market value of stocks listed on the New York Exchange fell, according to estimates, by over $15,000,000,000, to be followed during the first half of November by another decline of over $8,000,000,000. On the New York Curb Exchange the decline was equally drastic, and on all other exchanges throughout the country security prices crumpled as never before. It is probably not an exaggeration to say that quoted values of American stocks, listed and unlisted, experienced a decline of over $40,000,000,000.

VOLUME OF STOCK TRANSACTIONS

The volume of stock market transactions during 1929 was most extraordinary. Shares sold on the New York Stock Exchange totaled 1,125,068,620, as compared with 919,661,825 for 1928, 576,563,218 for 1927, 450,845,255 for 1926, and 317,000,000 for 1919 (the highest record of the preceding industrial cycle). Similarly, on the New York Curb Market 1929 stock sales totaled 473,770,970 shares, as compared with only 230,043,682 during 1928. In 1929 the New York Stock Exchange total exceeded that of 1928 by over 22 per cent, 1927 by over 95 per cent, and the 1919 total (the highest record established in the preceding cycle) by over 206 per cent. Almost without exception, every month of 1929 exceeded the corresponding month of 1928, and during the first eleven months of the year monthly transactions never fell below 69,000,000 shares. In the case of each of five months the total exceeded 100,000,000 shares.

THE MOVEMENT IN STOCK PRICES

Railroad Shares.—As explained in 1928, the increase in the price of speculative stocks during the first nine months of 1929 was almost as sensational as the increase in the volume of transactions. Babson's composite price for groups of selected stocks may be used for imitative purposes. Thus using his list of twenty representative railroad stocks, the September, 1929, average high price stood at 189.11, as compared with 144.34 for the corresponding month of 1928. But for all of the first nine months of 1929, the average was somewhat lower, namely 167.03 as compared with 142.65 for the corresponding nine months of 1928, 135.30 for the same months in 1927, 114.53 for 1926, 100.60 for 1925, 86.07 for 1924, and 74.34 for 1921. Railroad shares thus reached the highest monthly level during September of 1929, and as compared with the average price for 1921, this level shows an appreciation of approximately 138 per cent.

Industrial Shares.—In industrial stocks the increase in prices was even more extraordinary, and this is significant because of the enormous increase in the price level of these shares during 1928 and 1927. Again taking Babson's composite prices for 30 leading and representative industrial stocks, it appears that the September average high price for 1929 stood at 381.70, as compared with 241.72 for the corresponding month of 1928. For the first nine months of 1929 the average high is 338.90 as compared with only 219.41 for the corresponding nine months of 1928, 173.87 for the same months in 1927, 156.67 in 1926, 131.39 in 1925, and 75.09 in 1921. The first nine months' average of 1929 shows an increase of 58 per cent over the corresponding average of 1928.

Copper Shares.—A similar situation, and even more violent in extent, presents itself in the copper group. Although a substantial increase in the price level for this group occurred during 1928, a much greater advance occurred during 1929. According to Babson's composite prices for 20 leading and representative copper stocks the average high price for September, 1929, stood at 80.7 as compared with 56.3 for the corresponding average in 1928, or an increase of nearly 43 per cent. For the first nine months of 1929, the average high is 80.1 as compared with only 48.3 for the corresponding average in 1928, 32.7 in 1927, 29.4 in 1926, 27.4 in 1925, and 25.5 in 1921. The first nine months' average in 1929 shows an increase of 66 per cent over the similar period of 1928, and 142 per cent over the 1927 period.

Effect of Market Break.—But it is important to note that the market collapse following September much more than wiped out the appreciation just noted. The Babson averages for October and November of 1929 were not available at the time of writing, but a tabulation of quotations for the securities making up the list shows that the average low Nov. 13 for the 20 representative railroads shows that the break of a few weeks wiped out the whole appreciation of the preceding three years and brought the average back to the level of August, 1926. A similar computation for the industrial stocks shows that the collapse of a few weeks cut the average quotation of September in half and more than wiped out all of the extraordinary appreciation of 1929 and 1928.

CAUSES OF THE ADVANCE IN STOCKS

One of the interesting phenomena of the 1928-29 bull market was the rapid rise in stock prices while commodity prices were actually declining. Customarily bull markets in stocks have derived much of their inspiration from rising commodity prices as a means of augmenting corporate earnings. This time, however, corporate earnings were greatly enlarged through other factors, namely large scale machine production, increased efficiency, and instalment methods of selling. These factors permitted sales at lower prices but with greater profits. Much saving was also effected through numerous mergers in many important lines of industry. As a result of all of these factors increased earnings and dividends became quite general and were reflected more and more in the rising price level. At the same time more and more corporations listed their securities on some one of the nation's stock exchanges. Moreover, the number of stockholders greatly increased through the policy of many corporations to encourage employees and often the purchasers of their services to become stockholders (partners) in the enterprise. In other words, as never before, the multitude became acquainted with stocks and to an increasing degree participated in speculation. An increasing number gradually undertook to deal on margin, although knowing little about the dangers of the practice and although ill-prepared to weather any serious storm. This enlarged speculation helped materially to cause prices to rise finally without much regard as to whether actual earnings justified prices. The result was a gradually increasing disparity between corporate earnings and the price of corporate shares. Moreover, the demands for credit kept increasing until brokerage loans reached the unprecedented total in New York of $7,831,000,000 in September, or an increase of $1,849,000,000 since January, 1929. Demand money rates also rose to a monthly average of 11 per cent for May and remained at about 8 per cent during the months of June to September inclusive.

CONTRIBUTING CAUSES OF THE STOCK MARKET COLLAPSE

Speculative Inflation. — Conditions were ripe for a serious decline sooner or later. Few could anticipate the appalling suddenness and extent of the decline which did occur. When discussing causes we really have in mind not the occurrence of a decline, but rather the reasons for the suddenness and severity of the collapse. The fundamental cause was the same as for all previous declines of large dimensions,—the unwarranted inflation resulting from excessive speculation with borrowed funds. In all important respects the earmarks of previous bear markets presented themselves. Just before the break we were again told, as in previous periods of business boom, that we were living in a new era and that past occurrences need not be expected to repeat themselves. After the break the same confusing discussion of the causes, used in previous cases, was again experienced. Some blamed the Massachusetts Public Service Commission; others the Federal Reserve Banking system; others the Congressional failure to pass the Tariff Bill; still others the Stock Exchanges, etc. All of these are of course quite innocent. There is no use in emphasizing the mere match that sets off the explosive and to forget the real cause, *i.e.*, the vast accumulated mass of explosive itself, consisting of the accumulation of speculative error committed by a speculating multitude.

Absence of a Short Interest.—But while excessive speculation is the primary cause, which would have produced a decline in any case sooner or later, certain factors contributed to make the collapse more sudden and more severe than would otherwise have been the case. Among these, three deserve special mention. The absence of an adequate short interest in the market at the time of the decline. Never before probably did the short interest receive such a beating as during the bull market of 1928-29. Time upon time severe raids upon the market were overcome, only to be followed by a higher level of prices than before. By the end of September, 1929, the short interest was reduced to relatively small proportions. Consequently when the decline became serious, there was comparatively little covering on the part of short sellers. The short interest customarily constitutes an important stabilizing influence in the market, retarding on the one hand an unwarranted rise, and on the other hand checking an unwarranted decline through covering operations. Its function is to spread a decline over a long period and to make it gradual. This time, however, the short interest was largely absent, with the result that the collapse was swift, extraordinary in extent, and largely unchecked until thirty to fifty per cent of quoted values were wiped out in the various groups of stocks.

Operations of Investment Trusts.—The enormous buying of these investment trusts made it much easier for the market to rise to an excessive level. They were in large part responsible for the enormous advance in prices, and, therefore, indirectly for the subsequent extensive and disastrous decline.

Income on Stock Purchases and Sales.—This factor, in the opinion of many, had a decided bearing upon the sharpness of the stock market decline. In former bull markets, many owners of stock had a tendency to sell them when they felt that the price level reached a point above the value of the security, the proceeds being retained for the repurchase of the security when the price had reacted to a figure which they felt was below actual value. The practice served as a stabilizer, both with respect to the rise and the fall. But during the last great rise an exceedingly large proportion of this class of investors felt, after ascertaining the amount of income tax to be paid should they sell, that there was little likelihood of a drop in price sufficiently great to yield a substantial profit. They, therefore, gave up the idea of selling at all, with the result that one of the important stabilizing influences of the market was removed, thus contributing materially to the sharpness of the break.

THE BOND MARKET

Sales.—Bond sales on the New York Stock Exchange during 1929 totaled $3,020,300,000, as compared with $2,939,700,000 for the full year of 1928. In other words the volume of sales during the last year is approximately the same as it was in 1928. As explained in the last issue of THE AMERICAN YEAR BOOK, high money rates caused the bond market to remain comparatively dull, and also to decline moderately, its rise and resulting activity having occurred in the years 1921-25.

Price Level.—The 1929 price level for bonds, judging from Babson's composite price of 20 leading and representative bonds, was somewhat under that of the year before. The September, 1929, average stood at 90.9 as compared with the corresponding average of 95.0 for 1928, or a decline of approximately 4.3 per cent. As compared with the corresponding average of 1927 (97.2) the decline is nearly 6.6 per cent. For the first nine months of 1929, the average stood at 92.3 as compared with the corresponding average for 1928 of 96.7, 95.8 for 1927, 92.6 for 1926, 89.8 for 1925, 87.3 for 1924, 84.4 for 1923, 86.9

SECURITY MARKET PRICES

(Babson's Statistical Service)

	20 R. R. Stocks		30 Ind. Stocks		20 Rep. Copper Stocks		20 Rep. Bonds	
	1928 high	1929 high	1928 high	1929 high	1928 average	1929 average	1928 average	1929 average
Jan.	141.02	158.54	203.35	317.51	46.7	76.7	98.8	94.0
Feb.	136.44	161.32	199.35	322.06	43.8	83.0	98.6	93.4
Mar.	141.96	158.62	214.45	321.18	44.5	82.0	98.5	92.5
Apr.	145.16	152.16	216.93	319.29	46.2	82.5	98.0	92.6
May	147.65	153.95	220.88	327.08	49.6	77.0	97.4	92.5
June	144.33	161.68	220.96	333.79	48.6	75.3	95.9	91.9
July	139.83	179.13	216.62	347.70	48.3	77.1	94.7	91.7
Aug.	143.15	188.76	240.41	380.33	50.7	80.5	93.8	91.3
Sept.	144.34	189.11	241.72	381.17	56.3	80.7	95.0	90.0
Oct.	142.94	178.53*	257.13	352.86*	59.7		95.1	
Nov.	152.70		295.62		68.7		96.6	
Dec.	151.40		291.30		96.6		93.5	

* To October 24 only.

SHARES TRADED ON THE NEW YORK STOCK EXCHANGE

	1928	1929
January	56,919,395	110,895,940
February	47,009,070	77,968,730
March	84,973,869	105,661,570
April	80,478,835	82,600,470
May	82,398,724	91,283,550
June	63,886,110	69,546,040
July	39,197,238	93,378,690
August	67,191,023	95,704,890
September	90,578,701	100,056,120
October	98,831,435	
November	115,360,075	
December	92,837,350	

YEARLY TOTALS OF TRANSACTIONS

	Shares of Stock
1920	226,640,400
1921	172,712,716
1922	258,652,519
1923	286,115,040
1924	281,991,597
1925	461,404,733
1926	450,845,255
1927	576,563,218
1928	919,661,825
1929	827,006,000*

* Total for first 9 months only.

for 1922, 76.7 for 1921, and 73.4 for 1920. As compared with the 1920 level, the first nine months average of 1929 (92.3) shows an appreciation of nearly 27 per cent. As was pointed out last year, most of this increase occurred during the years 1921-22, following the great decline in interest rates from the high level prevailing during 1919 and 1920. As so often happens, it was explained that the bond market experiences its main rise in prices before the main movement in stock prices occurs. Later when interest centers so largely in stocks, as during 1929, and when interest rates reached such high levels, bonds with their fixed return, as compared with stocks, proved less attractive and receded in price to the extent already indicated.

THE MONEY MARKET

The account of 1928 explained that money rates showed a decided tendency to harden and that at various times call loan rates in New York reached 8 to 10 per cent. Although time and demand loan rates averaged only 4¼ and 4½ per cent during the first quarter of 1928, the monthly averages thereafter gradually rose until for December the average prime commercial paper rate (Babson's figures) stood at 5½ per cent and the New York call loan rate at 8½ per cent. During the first nine months of 1929 both rates remained consistently high. The January averages (Babson) stood at 5½ and 7½ per cent. By April the averages were 5⅞ and 8¾ per cent, for May, 6 and 11 per cent. Thereafter the monthly commercial

MONEY RATES

(Babson's Statistical Service)

	1928		1929		Av. Bank Rates—Eng., France and Germany		Gold Movements	
	Dom.	Call	Dom.	Call	1928	1929	1928	1929
January	4⅛	4¼	5½	7½	5⅛	4⅞	$13,766,000*	$47,199,000
February	4⅛	4⅜	5½	6¾	5	5⅛	11,120,000*	25,488,000
March	4⅛	4½	5¾	8⅞	5	5⅛	94,853,000*	24,835,000
April	4⅜	5⅛	5⅞	8⅜	5	5⅙	91,150,000*	23,093,000
May	4½	5⅝	6	11	5	5½	81,721,000*	23,631,000
June	4⅞	6⅛	6	7⅝	5	5½	79,931,000*	30,212,000
July	5¼	6⅛	6	9⅛	5	5½	63,959,000*	34,718,000
August	5½	6⅞	6⅛	8¼	5	5½	747,000	18,390,000
September	5¾	6¾	6½	8½	5	5½	463,000	17,636,000
October	5½	7⅛	6⅛	5	5	5⅞	13,339,000	
November	5⅜	6¾			5		6,675,000	
December	5½	8½			5		23,314,000	

* Exports exceed imports.

INDEX NUMBERS

	Bradstreet		Babson		London Economist	
	1928	1929	1928	1929	1928	1929
January	$13.5732	$12.9651	156	155	98.5	94.7
February	13.5263	12.9828	155	150	98.5	95.6
March	13.3409	13.0004	154	152	99.9	96.1
April	13.4161	12.8691	153	149	101.4	94.0
May	13.4376	12.6765	155	149	102.1	91.5
June	13.1913	12.4562	155	150	100.6	91.7
July	13.1418	12.4853	155	148	98.8	93.7
August	13.1903	12.6309	155	150	97.0	93.6
September	13.2813	12.6655	156	150	95.7	91.8
October	13.1285	12.7030	155		95.3	
November	13.0131		154		95.3	
December	13.1479		155		95.0	

X. BUSINESS AND FINANCE

YEARLY PRICE AVERAGE

	Bradstreet
1902	7.88
1903	7.94
1904	7.92
1905	8.09
1906	8.41
1907	8.90
1908	8.00
1909	8.51
1910	8.98
1911	8.7129
1912	9.1867
1913	9.2115
1914	8.9985
1915	9.8531
1916	11.8236
1917	15.6385
1918	18.7117
1919	18.6642
1920	18.8096
1921	11.3695
1922	12.1186
1923	13.4028
1924	12.8672
1925	13.9445
1926	13.0207
1927	12.7788
1928	13.2824
1929	12.7435*

* Average for 8 and 9 months.

CORPORATE FINANCING

(Babson's Reports)

	1928		1929	
	Capital	Refunding	Capital	Refunding
January	$408,544,852	$165,028,100	$ 827,728,946	$142,547,192
February	411,352,150	201,343,948	814,859,200	122,393,350
March	380,707,402	361,242,750	876,202,945	58,327,000
April	484,089,878	349,116,372	591,626,596	134,171,779
May	583,357,035	174,477,240	923,045,666	390,849,640
June	645,882,775	182,550,800	613,879,625	16,222,217
July	284,803,167	38,945,202	801,453,355	59,294,141
August	180,716,260	18,709,418	751,177,040	25,045,000
September	391,157,985	37,026,050	1,200,784,014	306,592,000
October	600,473,463	55,130,765		
November	702,055,267	58,574,220		
December	931,673,332	61,654,750		

paper rate never averaged less than 6 per cent and reached 6½ per cent in September. New York demand loan rates also remained high, the monthly averages being 7⅝ per cent for June, 9⅛ per cent for July, 8¼ per cent for August, and 8½ per cent for September. For the first nine months of 1929 the average commercial paper rate (Babson) was 5⅞ per cent, as compared with 4¾ per cent for the corresponding months of 1928, while demand loans in New York averaged 8⅜ for the first nine months of the year as compared with only 5½ per cent for the corresponding period of 1928. Following September, however, a notable change took place in favor of lower demand rates, owing to the sensational stock market liquidation and the huge reduction in brokers' loans. For October the average commercial paper rate was 6⅛ per cent, while the call loan rate dropped to 5 per cent. Subsequently a further reduction occurred, but monthly averages are not yet available to indicate the exact extent.

YEARLY TOTALS OF CORPORATE FINANCING

	Capital	*Refunding*
1929*	$7,400,757,387	$1,255,440,319
1928	6,014,765,666	1,738,274,615
1927	5,373,229,066	1,928,187,260
1926	4,357,002,720	942,550,970
1925	4,100,725,167	637,384,524
1924	3,322,295,764	516,275,300
1923	2,712,996,155	530,343,942

* For nine months.

VOLUME OF BANKING TRANSACTIONS

BY S. S. HUEBNER

WHARTON SCHOOL OF FINANCE AND COMMERCE, UNIVERSITY OF PENNSYLVANIA

TOTAL CHECK TRANSACTIONS

Check transactions, as explained in previous issues of THE AMERICAN YEAR BOOK, constitute an excellent business barometer, since the published data is sufficiently complete to represent the entire nation as well as all lines of business. Check transactions for the nation during 1929 indicate a condition of business prosperity slightly greater than that of the previous year. For the first nine months of 1929 (using the figures of Babson's *Reports on Fundamental Conditions*), check transactions greatly exceeded any previous year for the corresponding period, just as the 1928 figures far exceeded those of any previous year. The total for the first nine months stands at $726,819,199,000, as compared with $611,559,569,000 for the same nine months of 1928, $521,935,944,000 for 1927, $481,244,401,000 for 1926, and $440,000,000,000, $380,000,000,000, $366,000,000,000, $329,000,000,000, and $298,000,000,000, respectively, for 1925, 1924, 1923, 1922 and 1921. The 1929 figure exceeds that of the corresponding period of 1928 by nearly 10 per cent whereas the total for this period of 1928 exceeded that of the previous year by over 17 per cent. As compared with the last depression year,—1921,—the total for the first nine months of 1929 is larger by 143 per cent. But allowance must be made, as in previous issues of THE AMERICAN YEAR BOOK, for three important factors,—the normal increase in the nation's business development, the increased use of clearing facilities, and the unparalleled speculative activity on our leading stock exchanges. When these factors are taken into account, the total of banking transactions in 1929 indicates a volume of business activity, exclusive of security market activity, slightly greater than that of the year before.

December figures (as published by the *Commercial & Financial Chronicle*) indicate that the record of the first nine months is not being maintained. For the week ended Dec. 21, clearings for the various Federal Reserve districts show the following increases or decreases as compared with the corresponding week of 1928: Boston district (12 cities) — 20.3%; New York (11 cities) — 15.1%; Philadelphia (10 cities) + 0.2%; Cleveland (8 cities) — 9.9%; Richmond (8 cities) — 1.0%; Atlanta (12 cities) — 6.2%; Chicago (20 cities) — 13.5%; St. Louis (8 cities) —12.1%; Minneapolis (7 cities) — 6.4%; Kansas City (11 cities) + 13.1%; Dallas (5 cities) — 1.5%; and San Francisco (17 cities) — 13.1%. The predominant importance of New York should again be noted, that district's total of $7,712,000,000 for the week comparing with $4,556,000,000 for all of the balance of the country.

CHECK TRANSACTIONS IN NEW YORK CITY

New York City constitutes the nation's center of speculative activity in the security market, and 1929 transactions in the stock market tremendously exceeded those of 1928 or any other year. It is, therefore, important to note the volume of check transactions for New York, in contrast to the figures for the rest of the country. For the first nine months of the year, New York check transactions totaled $440,480,896,000, or $172,000,000,000 (62 per cent) in excess of the total for the rest of the country. As compared with 1928, New York City check transactions for 1929 (for nine months) increased by over $91,000,000,000, while the increase for the rest of the country was less than $14,000,000,000. This disproportionate increase reflects the unprecedented transactions of the year on the New York security markets, the volume of such transactions on the New York Stock Exchange for 1920 (first nine months) exceeding by far the

CHECK TRANSACTIONS

(Babson's Reports)

(000 excluded)

	Exclusive of New York		Inclusive of New York	
	1928	1929	1928	1929
January	$28,655,144	$32,068,884	$66,535,718	$86,788,132
February	25,004,091	27,883,365	57,744,977	74,172,115
March	24,458,725	32,235,997	74,245,018	87,660,975
April	28,704,178	29,645,065	70,482,021	78,666,322
May	29,929,252	29,248,417	75,199,164	80,357,235
June	31,903,264	30,300,914	77,358,569	74,627,677
July	27,408,041	32,468,059	62,492,679	81,683,239
August	26,702,570	32,141,718	61,804,850	81,175,280
September	27,912,427	31,345,924	66,637,717	81,688,224
October	31,657,632		76,847,102	
November	29,489,911		74,959,146	
December	33,868,604		86,595,144	

corresponding record of previous years, the total being 827,000,000 shares. This total is nearly equal to the twelve months record of 1928 (920,000,000 shares) and exceeds the nine months total for the year by 215,000,000 shares.

CHECK TRANSACTIONS OUTSIDE NEW YORK CITY

The foregoing figures indicate the importance of considering separately the check transactions of the country after New York City is excluded. Exclusive of New York City, the 1929 nine months' total for the nation stands at only $277,383,303,000 as compared with $253,642,127,000 for the corresponding period of 1928. The increase of $24,000,000,000 amounts to only 9½ per cent. The figure for 1929, therefore, excluding New York City, indicates again, as was also explained for last year, the maintenance of a high level of business activity, but without any increase of moment as compared with 1928. The conclusion is again inevitable that, if allowance is made for the normal increase in the nation's volume of business as well as the normal increase in the use of checking facilities, the general business activity of 1929, exclusive of stock market activity, was approximately the same as that of 1928.

YEARLY TOTALS OF CHECK TRANSACTIONS

	Exlusive of New York	Inclusive of New York
1929	$277,338,303	$726,819,199*
1928	348,658,274	849,960,961
1927	323,190,085	714,747,979
1926	309,363,401	648,418,649
1925	292,394,131	605,760,384
1924	260,310,695	523,957,472
1923	256,556,999	495,097,836
1922	222.152,058	463,987,457
1921	199,087,442	405,976,001
1920	242,069,771	484,500,290
1919	210,547,763	457,970,614

* Total for first nine months only.

FOREIGN TRADE

By Roland L. Kramer

Wharton School of Finance and Commerce, University of Pennsylvania

YEAR'S GAIN IN VALUE AND VOLUME

Foreign trade during the fiscal year 1928-29 registered a marked increase over the figures of the preceding year. Exports were particularly active reaching the huge total of $5,374,000,000 which is approximately ten per cent greater than the exports for 1927-28. The import trade likewise registered an increase, the value being $4,292,000,000 or three and one-half per cent in excess of the figures for the preceding year. Thus, foreign trade for the year ending June 30, 1929, reached the stupendous total of $9,666,000,000 which is the greatest aggregate foreign trade for the U. S. since the postwar depression. Imports represented a larger increase in volume than the value statistics indicate because the average import prices were about five per cent less than during the preceding year. While export prices remained substantially the same, the quantitative increases in both exports and imports were approximately ten per cent.

EXPORTS, IMPORTS AND BALANCE OF TRADE

(in millions of dollars)

	Exports	*Imports*	*Balance of Trade*
1910-14, average	2,166	1,689	477
1927-28	4,877	4,148	729
1928-29	5,374	4,292	1,082

THE TRADE BALANCE

Merchandise.—The balance of merchandise trade for the year under consideration exceeded one billion dollars, which is the greatest excess of exports over imports since 1921-22.

Gold and Silver.—Heavy imports of gold during 1929 which, for the first six months amounted to $174,457,000, resulted in a net gold import for the fiscal year 1928-29 of $155,137,000. This represented a decided reversal of the movement of the preceding fiscal year, when there were net exports, aggregating $498,000,000. Silver showed a slight reduction from the previous year, the net exports being $17,000,000.

Visible Items in Trade Balance.—Bringing together all of the visible items which enter the foreign trade, the following tabulation of the visible balance of trade may be made:—

(in millions of Dollars)

	Exports	*Imports*	*Balance*
Merchandise ..	5,374	4,292	+ 1,082
Gold	112	267	— 155
Silver	86	69	+ 17
Net visible export balance....			+ 944

Invisible items in the foreign trade are available only for calendar years. Statistics of foreign securities publicly offered in the United States during the fiscal year are obtainable and these constitute one of the principal invisible items. The total nominal capital issued during 1928-29 amounted to $925,359,427. This acting as an import is of obvious significance in offsetting largely the net visible export balance of $944,000,000. As 1929 advanced, however, the volume of foreign capital issues floated declined tremendously, the issues of the three quarters to Sept. 30, 1929, being only $568,553,492.

FOREIGN TRADE BY ECONOMIC CLASSES

(per cent of total)

	Crude Materials	*Crude Foodstuffs*	*Mfd. Foodstuffs*	*Semi-Mfrs.*	*Fin. Mfrs.*
Exports					
1910-14 .... (Average)	33.5	5.9	13.8	16.0	30.8
1927-28	24.6	7.7	9.6	14.9	43.2
1928-29	23.5	6.1	9.1	13.8	47.5
Imports					
1910-14 .... (Average)	35.2	12.0	11.5	18.2	23.1
1927-28	37.1	13.2	10.2	18.0	21.5
1928-29	35.2	12.7	9.9	19.8	22.4

THE EXPORT TRADE

Finished Manufactures.—In the export trade, finished manufacturers continued the growth in importance which has characterized this class since before the war. Nearly half the exports during 1928-29 constituted articles of this type. Compared even with with the preceding year, a marked increase in importance is to be noted. Seven eighths of the gain in exports during 1928-29 as compared with 1927-28 was registered in this one group. No surer evidence of industrial expansion in the past decade and a half need be sought. Machinery of various types contributed heavily to the growth in finished manufactures. Automobiles, parts and accessories, the third largest item in the export trade, registered an increase of 39 per cent over the trade of the preceding year. Tractors and parts increased 35 per cent and harvesting machinery 48 per cent. Petroleum products, which ranked fifth in the export trade, registered a gain of 14 per cent over 1927-28 despite no change in quantity. Gasoline alone showed a 30 per cent increase. Illuminating and lubricating oils showed a smaller growth over the preceding year. There were also during the year "marked increases in exports of rubber footwear, structural shapes, cutlery, radio apparatus, oil-well machinery, metal-making machinery and also refrigerating equipment."

Crude materials, the second largest group of exports, registered a gain of 5½ per cent over 1927-28. Unmanufactured cotton which retains by a wide margin its leadership of all commodities exported from the U. S. alone comprised 70 per cent of crude materials shipments. This item registered a gain of 7.6 per cent in quantity and of 5.8 per cent in value compared with the preceding year. Crude oil, although constituting only 6½ per cent of the group of petroleum and its products, showed an increase of 28.4 per cent in quantity and of 19.8 per cent in value. Tobacco likewise registered increases of 15.5 per cent and 8.9 per cent while coal expanded 17.5 per cent and 11.7 per cent respectively. In the four items mentioned, price reductions prevented still larger gains in value commensurate with tonnage increases.

Semi-finished Manufactures.—The third largest group of exports, semi-manufacturers, was substantially the same as during the preceding year. Copper showed an increase of 11 per cent in value in spite of a reduction of 6½ per cent in quantity. Iron and steel articles increased, but leather, gas and fuel oil declined.

Foodstuffs, both crude and manufactured, decreased in relative importance in the export trade, the recession being particularly evident in the crudes. Slight gains were registered in packing house products, oil cake and meal, with larger relative increases in canned and evaporated fruits and canned salmon and sardines. On the other hand, flour declined about 10 per cent. Crude foodstuffs, as a group, showed a decrease of 12 per cent from the figures for 1927-28. Wheat, which comprised about 40 per cent of this group, suffered an enormous decline, by far the greatest set-back of any important export item. Not alone did the quantity of wheat shipped out of the country decline 30 per cent, but price recessions caused a decrease of 40 per cent in value to be recorded. Rye showed a small falling off, but fruits and nuts, by registering an improvement of 32 per cent over the preceding year, prevented a more serious decline in exports of crude foodstuffs.

THE IMPORT TRADE

Crude Materials.—Changes in the import trade were far less marked than in the case of exports. Crude materials, continuing by far to be the largest group of imports, declined in relative importance from 37.1 per cent to 35.2 per cent, a shrinkage of 2 per cent in value as compared with the preceding year. Price recessions in many lines accounted for the falling off in this group. Raw silk, at once the leading import item as well as crude material, showed an increase of 3.1 per cent in value and 2.1 per cent in quantity. On the other hand, raw rubber suffered a decline comparable with the set-back of wheat among the exports. Recessions of nearly one-half in the price of rubber caused a decline of 24.4 per cent in value, in spite of an increase in quantity, amounting to 32½ per cent. Smaller decreases were registered in tobacco and hides and skins, while cotton, wool and oilseeds showed advances.

Finished manufactures, the second largest import group increased slightly over the figures for 1927-28, the growth being distributed over a considerable number of items.

Semi-finished manufactures showed an improvement of 14 per cent over the preceding year, copper contributing heavily to this expansion. With an increase of 40 per cent in quantity, there was registered an enhancement of value, based on price advances, amounting to 69 per cent. This change elevated copper from thirteenth to eighth in the list of imported commodities. Expressed vegetable oils likewise expanded in a comparable manner, the increase in quantity being 35 per cent and in value 28 per cent. Smaller improvements were recorded in wood pulp, dressed furs and precious stones.

Foodstuffs, both crude and manufactured, showed relatively slight decreases compared with the preceding year. Coffee, the second most important import, despite a falling off of 6½ per cent in quantity, registered an increase of 3½ per cent in value. This improvement was offset by a decline in cocoa. Cane sugar, the leading manufactured foodstuff and fourth item of importance among all imports, decreased 9 per cent in value although a quantitative increase of 17½ per cent was recorded. However, there were increases in imports of edible olive oil, meats, fodders and feeds, molasses and cheese.

GEOGRAPHICAL DISTRIBUTION OF EXPORT TRADE

Europe.—Exports in 1928-29 continued the trend away from Europe as a market and the consequent increase of importance in non-European areas. There were increases in exports to Belgium, France, Italy, Spain, Sweden and the United Kingdom, but these were more than offset by the decline in the trade with the Soviet Republic, Germany and Netherlands. The falling off in wheat contributed heavily to this shrinkage. There were, however, increases in exports of cotton, copper, gasoline and automobiles in some directions.

Canada.—Northern North America purchased the largest volume heretofore recorded. This was occasioned principally by the position of Canada, which not only maintained its leadership of the export markets of the United States, but showed an increase of 15 per cent over the trade of 1927-28. The major articles which supported this enhancement were coal, gasoline, machinery, automobiles and iron and steel.

Latin-America.—Exports to Latin America showed an increase in relative importance over the preceding year. This was accomplished by the overbalancing of a decline in southern North America by a greater increase in South America. Exports to Cuba registered a further decline, while Mexico showed signs of improvement with an advance of 9 per cent. The largest relative increase of the year occurred in South America, where exports to every country except the Guianas showed enhancement. Argentina increased by 23 per cent during 1918-29 to a total of $207,000,000. Passenger automobiles and trucks were responsible for a considerable share of the increase and were important factors in the gain of approximately one-third in exports to Brazil and Chile. Exports to Venezuela were more than two-thirds greater in consequence of a larger demand for casing and oil-line pipe, passenger automobiles, and many miscellaneous manufactures.

Asia.—Enhanced trade was supported by increases in exports to every country except India, Ceylon and British Malaya. China's trade showed a growth of 40.8 per cent over the preceding year. This expansion was occasioned by greater sales of leaf tobacco, cigarettes, wheat flour, cotton, kerosene and passenger automobiles. Increased purchases of cotton enabled Japanese trade to show an improvement of 15 per cent over 1927-28 while the Netherlands East Indies registered an expansion of 32½ per cent. Exports to the Philippine Islands increased 17 per cent and to Turkey the growth was 34 per cent.

Oceania, although in exactly the same relative importance as the previous year, held pace with the general advance in trade. Australian sales increased 8.8 per cent and New Zealand 19.2. In the case of Africa general advances were recorded, with British South Africa, the leading market, registering an increase of 18 per cent over the preceding year.

GEOGRAPHICAL DISTRIBUTION OF IMPORT TRADE

Europe.—Increases in imports from every continent except Latin North America were recorded during the year, although Asia registered a decline in relative importance. Europe remained at substantially the same percentage as for 1927-28, with most countries showing advances in the value of trade. The principal decrease occurred in the United Kingdom, in which case imports declined 5.8 per cent from the preceding year. This decline was more than offset by the expansion of 16.4 per cent in German imports. Increases of importance also occurred in purchases from France, Italy, Sweden, and the Soviet Republic, while Belgium, Norway and Netherlands declined.

Asia receded slightly in relative importance, although an advance of 1 per cent in value was registered. The lower price of rubber accounted largely for the decrease in imports from British Malaya and Netherlands East Indies, the reductions being 10 per cent and 6 per cent, respectively. On the other hand, increased purchases of silk and tung oil supported an expansion of 11 per cent in imports from China. British India registered the same proportionate increase as occurred in the case of China.

Latin America improved in relative importance, the expansion, as in the case of exports, occurring in the trade with South America. Cuban imports declined in value by reason of the lower price of sugar and Mexican trade continued its downward course with a falling off in purchases of mineral oils and lead. The expansion of South America was supported by the gains in imports of copper from Chile and Peru, of coffee and crude petroleum from Venezuela and of meats from Uruguay. The latter country showed an increase of 64 per cent over the preceding year, while for the other South American countries named, the expansion ranged between 33 and 39 per cent.

Oceania.—Imports held the relative importance of the preceding year. A decline of 9 per cent in purchases from Australia was offset by an increase of 37 per cent in the case of New Zealand. Africa showed a slight advance over 1927-28, larger imports of cotton from Egypt supporting an increase of 38 per cent for that country. British South Africa improved 8 per cent.

RAILROAD TRAFFIC AND EARNINGS

By G. Lloyd Wilson

Professor, University of Pennsylvania

CAPITAL INVESTMENT

Earnings and Expenditures.—Railroad traffic and earnings in 1928 again exhibited mixed trends, continuing the record of irregularity since 1926. The investment of Class I carriers amounts to $676,665,000, making a total of nearly $5,500,000,000 for enlargements and improvements in railway properties since 1922. Expenditures in this period have been distributed as follows: freight cars 29%, passenger cars 6%, locomotives 12%, other equipment 2%, additional tracks 16%, heavier rails 4%, ballast 2%, shops and engine houses 4%, all other improvements 25%.

Gross and Net Capitalization.—The total property investment accounts of Class I railways, including road and equipment, materials, supplies and cash amounted to $25,234,162,651 at the beginning of 1929, an increase of approximately $4,000,000,000 since 1922. The net capitalization of Class I carriers, representing the total amount of railroad securities of all classes outstanding in the hands of the public, amounted to $18,136,691,445, of which $11,380,644,844 or 62.7% was funded debt, and $6,756,046,601 or 37.3% was capital stock. The railway net capitalization is increasing at the rate of approximately 21% per annum.

RAILROAD MILEAGE

Class I, II, and III Carriers in 1928 operated an average of 260,546 miles of line and a total of 427,750 miles of all trackage including yard tracks and sidings, compared with 259,639 miles of line and 427,750 miles of trackage operated in 1927. This continues the trend of gradually increasing railroad operated mileage and trackage which has persisted since 1922. In that year the railroads operated 275,425 miles of line and 409,359 miles of track.

Factors in Mileage Increase.—The growth of railroad mileage and trackage reflects the development of traffic and the continuance of the conservative and constructive policy of the Interstate Commerce Commission in granting carriers permission to construct new mileage or trackage, to acquire and operate existing facilities, or to abandon the operation of existing trackage in the interest of the public convenience and necessity. The amount of railroad mileage constructed or placed in operation each year has slightly more than offset the decrease in miles of line and trackage abandoned because of the exhaustion of the resources for which the lines were built to serve.

RAILROAD EQUIPMENT

Condition of railroad equipment in 1928 was very good and this has continued through 1929. The carriers have continued the peak loads of traffic in 1928 and in 1929 without serious car shortage and with comfortable margins of active locomotives in good repair available for duty. The Car Service Division of the American Railway Association reported Aug. 1, 1929, that the situation with respect to railroad transportation equipment on July 1, 1929, compared with previous years at that date not only favorably but for the most part established new records.

Increase in Motive Power.—The replacement of obsolete passenger and freight cars and locomotives with new modern equipment continued throughout 1928 and 1929. The number of locomotives has decreased steadily since the peak year, 1924, when 69,486 locomotives were in service. The number in service at the close of 1928 was 63,311 and a corresponding decrease has been made during 1929. Although the number of locomotives has decreased, the average tractive force or power of locomotives has greatly increased. The average per locomotive in 1928 was 43,838 pounds and only 39,891 pounds in 1924 and 27,282 pounds in 1910. It is safe to state that the average tractive power of locomotives in service in 1929 is more than 60% higher than that of the locomotives in service in 1910. The total tractive power of all steam locomotives in service on Class I railways amounted to 2,579,795,850 pounds in 1928. Increases are noted in the number of electric locomotives, diesel locomotives, and gasoline, gas-electric and other types of locomotives and self-propelling railroad cars, carrying forward the trends in this direction recorded in the preceding several years. Important developments and experiments are being made in electrification and in the use of other means of propulsion than steam locomotives.

Passenger Train Equipment.—The number of passenger cars continues to decrease. In 1924, the peak year, there were 57,451 passenger train cars in service, while in 1928, 54,800 cars of this class were in use. It is a matter of interest that there were 54,492 such cars in service in 1914, and 55,810 in 1915. Decreases in passenger traffic and the increased size of present day railroad passenger-carrying equipment are jointly responsible for this condition. Despite the reduction in the number of passenger train cars in service, great progress was made in 1928 and continued in 1929 in the improvement in the size, beauty and comfort of passenger train equipment. Wooden and part-wood and part-steel coaches are being replaced steadily with larger and more commodious all-steel cars. Improvements are being made in the seating arrangements, ventilation, heating and lighting of the cars. Compartment or stateroom sleeping cars fitted with beds instead of berths were introduced by several railroads in 1928 and 1929.

Freight Cars.—The number of freight cars, excluding caboose cars, continued to decrease in 1928 and 1929. The number in service at the close of 1928 amounted to 2,346,751 cars, compared with 2,378,800 cars at the close of 1927, and with the peak of 2,414,083 cars reached in 1925. Here again the decrease in number of units has been offset by the advances in size and quality of the cars, and wooden box and open-top cars of greater carrying capacity. The average carrying capacity of freight cars in service on Class I railroads in 1928 was 45.8, while in 1929 this figure was approximately 46 tons, an increase of nearly

3½ tons average carrying capacity per railroad freight car since 1920, and a 25% increase in capacity since 1910. The total freight-carrying capacity of all Class I railroad freight cars in 1928 was 105,327,404 tons, compared with 98,342,666 tons in 1920, and about 77,000,000 tons in 1910.

Motor Busses and Trucks.—The number of motor passenger busses and freight carrying trucks operated by railroads, subsidiary companies or agents increased in 1928 and 1929. Seventy-two steam railroads operated 2,115 busses at the beginning of 1929, while 70 railroads used motor trucks in line haul, terminal or store-door freight services.

RAILROAD EMPLOYMENT AND WAGES

The Interstate Commerce Commission in its 1929 report placed the average number of railroad employees of Class I railways, excluding switching and terminal companies at 1,656,411 persons, a decrease of approximately 80,000 from the total of 1,735,105 persons employed in 1927, and of more than 400,000 from the total of 2,022,833 persons employed in 1920. The efforts of the carriers have been directed consistently toward reduction of forces and decreases in operating expenses since the return of the railroads from Federal control to their corporate owners in 1920. Total compensation of railroad employees in 1928 amounted to $2,826,590,000 compared with $2,910,180,000 for 1927 and $3,681,801,000 in the peak year 1920. Class I carriers paid the average railroad employee $1,706.78 per annum in 1928; $1,677.24 in 1927, and $1,820.12 in 1920. The average wage paid decreased from 1920 to 1924 when the amount was $1,613.47, but it has increased steadily each year since 1924, indicating an average improvement in wage rates despite a decreasing number of persons employed. The average wage per railroad employee has increased approximately 127% since 1920 while the cost of living has increased about 72%, according to the figures compiled by the Committee on Public Relations of the Eastern Railroads. The ratio of wages to revenues earned in 1928 was 46.25% in 1928 which compares favorably with the ratio of 47.43% in 1927 and of 50.59% in 1920. In 1928 wages bore a ratio of 63.83% to total expenses. The corresponding ratio in 1927 was 63.62% and in 1920 it was 62.15%.

OPERATING REVENUES AND EXPENSES

Class I Roads.—The revenues of Class I railways in 1928 amounted to $6,111,736,000, a decrease of nearly $25,000,000 under the revenues of $6,136,300,000 and a substantial reduction under the operating revenues for the peak year, 1926, when operating revenues amounted to $6,382,939,000. The revenues for the full year 1929 should very nearly equal the total for 1926. The first six months of 1929 broke all records for corresponding periods, but the last six months did not carry forward the record of the first six.

Freight and Passenger Revenues.—Freight revenue in 1928 amounted to $4,680,456,000 in comparison with the total of $4,632,321,000 in 1927 and $4,317,440,000 in 1920. Passenger revenues in 1928 fell below the revenues for the preceding year for the eighth time since 1918. The competition of the private automobile and the passenger bus have caused steady declines in passenger traffic and corresponding decreases in passenger revenues. This trend continued in 1929. The serious nature of the loss in passenger revenues is revealed in the following figures.

Year	*Railroad Passenger Revenues*
1918	$1,031,563,000
1919	1,178,454,000
1920	1,286,613,000
1921	1,151,771,000
1922	1,074,108,000
1923	1,145,699,000
1924	1,075,039,000
1925	1,056,395,000
1926	1,041,816,000
1927	974,951,000
1928	901,019,000

Net railway operating income in 1928 amounted to $1,182,467,000, an increase of a little more than $100,000,000 over the income for 1927 and $40,000,000 less than the banner year, 1926. The net railway income for 1929 will probably exceed the income for

1927 so as to yield between $1,200,000,000 and $1,300,000,000.

Railway taxes continue upward amounting to $389,432,415 in 1928, compared with $376,110,250 in 1927 and $388,922,856 in 1926.

Maintenance of way and structures accounted for 13.71% of railroad revenues in 1928, a slight decrease under the 14.15% ratio of 1927 and 3% less than the heaviest year, 1920, when this amounted to 16.71%. Maintenance of equipment expenses amounted to 19.09% in 1928, while in 1927 these expenses accounted for 19.87% of the railroads' revenues and in 1920 they amounted to 25.74%. This year was the peak for this item as well as for expenses to maintenance of way.

Operating Revenues and Expenses.—Preliminary reports for 1929 place gross operating revenues at $6,357,000,000, an increase of nearly 3% over the revenues for 1928, and operating expenses at $4,535,000,000 an increase of about 1½% over the previous year. The increased expenditures in 1929 were due to increases in the amounts spent for roadway and equipment.

OPERATING RATIOS

The pulse by which railroad operation is guaged is the operating ratio,—the percentage relationship of total operating expenses to operating revenues. This ratio has ranged between 65% and 94% since 1910. In 1928, the operating ratio was 72.45% which may be compared with the figure of 74.54% in 1927 and 94.38% in 1920. In 1929 the ratio, when reported officially, will doubtless be somewhere close to 72%.

The operating ratios for selected years are significant:

Ratio: Operating Expenses to Operating Revenues

Class I Railroads (except as shown)

Year	*per cent*
1910	66.92
(Class I, II and III Railroads)	
1914	72.91
(Class I, II and III Railroads)	
1918	81.39
1920	94.28
1925	74.10
1926	73.15
1927	74.54
1928	72.45
1929 (Estimated)	72

RAILROAD FREIGHT TRAFFIC

Tonnage and Trends.—Freight tonnage, originating in 1928, fell slightly under the amount of traffic originated in 1927;—1,371,359,000 revenue tons in 1928, and 1,372,547,000 revenue tons in 1927. Both these years fell below the record breaking full year of 1926 when 1,439,612,000 revenue tons of freight were originated by railroads in the United States. The traffic originated during the first six months of 1929 was heavier than in any previous year and heavy traffic continued throughout the summer and early autumn. Later in the year, however, traffic fell below corresponding weeks in 1928 and 1926, so that the total yearly traffic for 1929 when officially reported will fall less than three-quarters of 1% below the record year 1926. If the abnormal export movement of coal in 1926 due to the British coal miners strike at that time is excluded, the amount of tonnage originated in 1929 was the heaviest ever loaded. The revenue ton-miles hauled, that is the number of tons of revenue-paying freight carried one mile, in 1928 amounted to 436,087,000,000 ton-miles, an increase of more than 4,000,000 ton-miles over 1927 when 432,014,000,000 ton-miles were hauled. In 1926 447,444,000,000 ton-miles were carried. Preliminary figures for 1929 indicate that 1929 will exceed all other years in the number of ton-miles of revenue freight hauled with approximately 490,000,000,000 ton-miles, an increase of nearly 1% over the previous record year, 1926.

Car Loadings.—Loaded car miles increased in 1928 over 1927. In 1928, 17,938,000,000 loaded car miles were moved, compared with 17,561,000,000 in 1927 and 17,925,000,000 in 1926. Unofficial estimate for the full year 1929 indicate that this year will break all records in this respect also. The final figure will doubtless be about 18,250,000,000 loaded car miles. The increases in loaded car-miles and ton-miles hauled indicates that the average length of haul is increasing due to the fact that railroad freight traffic is consisting more and more of bulk freight moving long distances. An increasing amount of high grade merchandise freight in the short hauls is moving via motor truck. The average haul in 1926 was 310.81 miles; in 1927, 314.75 miles; in 1928, 318 miles, and in 1929 about 322 miles estimated. Freight car loadings exceeded 1,000,000 cars per week for 28 weeks in 1929, equaling the record established in 1926 and exceeding by far the number of million car weeks in 1928.

PASSENGER TRAFFIC

The number of passengers carried in 1928 was 798,000,000, a decrease of 42,000,000 from the total carried in 1927. The railroads have not carried a billion passengers a year since 1923, when the number was 1,099,000,000. Passenger miles decreased in 1928 to 31,718,000,000, from 33,798,000,000 in 1927 and 35,673,000,000 in 1926. The average journey per passenger was 39.72 miles in 1928; 40.23 miles in 1927; 40.79 miles in 1926. Average receipts per passenger were $1.133 in 1928, $1.167 in 1927 and $1.20 in 1926. Revenue per passenger-mile amounted to $.02854 in 1928, $.02901 in 1927 and $.02941 in 1926. Figures have not been compiled for 1929 but there has been no marked change in the downward trend in the number of passengers carried, or in the number of passenger-miles hauled.

OPERATING PERFORMANCE

Freight Service.—The increased efficiency of railroad freight service is indicated by the figures in the following table:

	Years Ending December 31,			
Items	1920	1926	1927	1928
1—Tons per loaded freight car	29.13	27.35	27.06	26.50
2—Tons per freight train	647	701	702	718
3—Loaded car-mi. hauled	15,356,139,000	17,778,602,000	17,432,267,000	17,818,685,000
4—Empty car-miles hauled	7,261,785,000	10,152,419,000	10,311,248,000	10,512,943,000
5—Average length of haul:				
a. For United States as a system	303.52	310.81	314.75	318.00
b. For each individual r'd	170.41	170.29	172.11	174.14
6—Revenue ton-miles per mile of road	1,748,451	1,875,304	1,801,414	1,802,703

TRANSPORTATION RECEIPTS

Freight and Passenger.—The average receipts per ton of freight originated increased in 1928 to $3.479 per ton, compared with $3.445 per ton in 1927 and $3.408 per ton in 1926. The revenue per ton-mile fell slightly how, ever, due to the increasing length of hauls, from $.0196 in 1926, to $.0195 in 1927 to $.0194 in 1928. At the same time receipts per passenger fell from $1.20 in 1926 to $1.167 in 1927 and to $.134 in 1928. Revenue per passenger mile fell likewise from $.02941 in 1926 to $.02901 in 1927 to the sum of $.02854 in 1928.

Rate of Return.—Heavier freight traffic and increase railroad operating efficiency resulted in improvement in the rate of return upon the property investment of the carriers. The Interstate Commerce Commission in 1922, fixed the fair return at 5¾%. Rates are directed by law to be fixed so as to yield this return to carriers under efficient and honest management. Never since the passage of the Transportation Act of 1920 which declared this rate-making policy, have the carriers of the United States as a whole achieved this goal, although many individual carriers have equaled or exceeded it many times. In 1928 the rate of return was 4.71% for the carriers as a whole and in 1929 it is estimated that the carriers of the United States will earn approximately 5% upon the value of their properties used in the public service. The return is still below that fixed in 1922.

DIVIDEND PAYMENTS

Year	*Proportion of Stock Paying Dividends*	*Amount of Dividends Paid*	*Average Rate of Dividend on All Stock*	*Average Rate of Dividend on All Stock*	*Rate of Return*
	%		%	%	%
1920	57.30	$331,102,938	3.74	6.52	0.21
1921	56.92	456,482,092	5.13	9.02	2.84
1922	59.38	338,802,695	3.78	6.37	3.58
1923	62.09	411,881,766	4.53	7.30	4.38
1924	64.97	385,129,890	4.14	6.37	4.21
1925	66.70	409,645,051	4.35	6.52	4.74
1926	69.12	473,682,830	5.06	7.32	4.98
1927	70.25	567,280,717	5.95	8.47	4.29
1928	73.65	510,017,987	5.25	7.12	4.71
1929	(not available)				4.99 (Estimate)

OUTSTANDING TRAFFIC DEVELOPMENTS IN 1929

The outstanding developments in 1929 in the traffic of railroads of the United States may be summarized as follows: 1. The second largest volume of traffic originated; 2. The largest number of revenue ton-miles hauled; 3. The highest peak of operating efficiency and economy yet attained; 4. A constructive increase in expenditures for betterments and improvements and for new facilities and equipment; 5. A very constructive program of capital expenditures for 1930 despite the collapse of the stock market; 6. The highest average daily movement per freight car. The average of 36.3 miles per car per day established in October, 1929, is the highest on record; 7. The handling of a larger volume of traffic in proportion to the number of cars and locomotives than in any previous year; 8. The highest average load per train on record; 9. The handling of freight traffic with the greatest fuel efficiency.

The coal consumption per one thousand gross ton-miles in 1929 was 123 pounds, five pounds less than the previous best year, 1928; 10. The fastest freight handling ever achieved, The number of tons of freight moved one mile by a train per hour was greater in 1929 than ever before, and the average movement per freight train per hour exceeded all previous records.

CONTROL OF PRODUCTION

By William F. Notz

Dean, School of Foreign Service, Georgetown University

FARM RELIEF

Federal Board.—During 1929 the problem of control of production in the United States centered around agriculture. In the creation of the Federal Farm Board by the Agricultural Marketing Act of June 15, 1929, the long-drawn-out efforts by the Federal Government in seeking a remedy for the disastrous effects of surplus crops have reached a definite method of solution upon the outcome of which the future welfare of large sections of our country and one of its major industries may in large measure depend. The work of the new Board thus far has consisted essentially in extending commodity loans to certain agricultural interests, including cotton, grain, fruits and vegetables and live stock, through local coöperative agencies for the purpose of financing the marketing of surplus crops.

Stabilization Policy.—In an official statement by the Board with respect to its stabilization policy, it was made known that this policy divides itself into two classes: normal operations, *i.e.*, increasing the effectiveness of coöperative organizations; and emergency operations, whereby, because of a large surplus of any commodity, the operation would consist of buying and taking off the market some considerable part of the tonnage so as to relieve the pressure, and carrying the product until some future date in the hope that there would be a more favorable opportunity for disposing of it. This latter operation would be carried out with money advanced by the Board, and if the final result of such operation shows a loss or deficit, it will be borne by the revolving fund as provided by the organic Act.

OIL PRODUCTION

Curtailment Problem.—For the first time, after several years of more or less fruitless efforts, definite progress has been made in dealing with the problem of overproduction in the oil industry. Due to the large increase in production of crude petroleum, the oil industry has been kept in a depressed condition, and renewed efforts were made during the year to find some effective means of curtailing production. The daily average production of crude oil in the United States has all but reached the 3,000,000 barrel mark, which is a gain of more than 20 per cent as compared with 1928, itself regarded as a big production year. New sources of production are constantly being opened up, and better methods of recovering the oil vastly increase the potential output at the present level of prices.

Conference of Governors.—Earlier in the year the American Petroleum Institute sponsored a plan to restrict production to the 1928 level, which, however, was rejected by the Federal Oil Conservation Board on the ground that the Federal Government had no authority to sanction such a project. Thereupon, President Hoover invited the governors of the chief oil-producing states to a conference on June 10 at Colorado Springs, but the meeting failed to frame a policy of regulation through an inter-state pact.

Production Agreements. — Subsequently, in September, Secretary of the Interior Wilbur completed agreements which will virtually stop oil production in the Kettleman Hills oil field in California, the newest and largest oil field in recent years, covering about 150 square miles, until January 1, 1931, or until the market for oil will justify production. The United States Department of the Interior, acting for the Federal Government, has jurisdiction over approximately 40 per cent of the Kettleman area, due to the fact that that much of it is public domain.

Gas Conservation.—Significant, because of its possible general application, is the California gas conservation law, which went into effect in September. It provides that oil production shall not be permitted when facilities are not available to utilize the gas that escapes from the wells. Most of the large companies operating in California have taken steps to hold down production, but a number of small producers have not yet come into line, and a court action is being prepared to test the constitutionality of the new law.

Restriction Methods.—In the mid-continental oil area restriction methods, existing for some time, have been continued. On October 8, the proration committee of producers voted to restrict production 50 per cent until January 1, 1930, limiting the output of the Oklahoma fields to 660,000 barrels per day.

Foreign Surplus.—A broader phase of the oil problem consists in the threat of large surplus foreign production from the great oil wells in Venezuela and Columbia, which are near enough to the coast line to permit placing that oil in the United States at a very low total cost. It is reported that agreements have already been reached among the leading producing interests, including the Royal Dutch Shell combination, with a view towards curtailing production in those oil fields.

OVERPRODUCTION OF SUGAR

World Crisis.—In the sugar industry of the world a crisis has come on, due to excessive production, which has been made the subject of a report by the League of Nations. The Economic Committee submitted a report on the world sugar situation to the League Council in August. The Report states that due to persistent excess of production the industry is being conducted in many areas at a loss. This is caused partly by improved methods of cane cultivation and partly by the determined endeavor of beet-producing countries to maintain or even to expand their output in the face of the greater natural advantages of their rivals. In 1928-29 production has advanced over consumption by 9.7 per cent. The remedy for this dilemma, the Report states, would be found in concerted action on the part of the manufacturers, but adds that on account of a continuous contest between the planters of cane and the beet growers, efforts of united action to control production have thus far not been successful.

Protective Measures Futile.—The subsidies, bounties, protective and preferential duties or geographical advantages under which seven-eighths of the world's sugar supply is produced or marketed, have, according to the Report, stimulated local production, diverted and twisted the channels of trade and have built a pyramid of differential prices, but collectively they have done nothing to restrain the forces which are adversely affecting the industry as a whole. The application of protective measures taken by various governments is shown in the experts' report to have defeated its own ends. The attempt by one country to check the influx of the world's sugar surplus into its markets, or to furnish the requirements of its market itself, has led others to retaliate.

Relief Proposals.—The Economic Committee recommends that an international agreement between all important producers, or alternatively between producers in exporting countries, shall be arranged with a view to stabilizing production for a few years. A similar agreement is recommended in order to secure a rational sales policy. It is also suggested that consumption might be further augmented by lowering the excise duties without diminishing the total revenue yield from this source of taxation. A return to the provisions of the Brussels Convention is not considered feasible. There is also general agreement among members of the Committee, that for the arranging of any understanding between producers intended to affect output, Government intervention, though it might be desirable, is not indispensable.

Cuban Export Control.—A development of importance in the Cuban-American sugar situation is the creation in Cuba of a coöperative export agency to control all foreign sales of Cuban sugar, beginning September 1st. The new organization was established by decrees signed by President Machado on July 26th and August 19th. This means the reversion by Cuba to a restrictive policy which is to operate through a coöperative agency formed by the Cuban Government under the direction of Colonel José Miguel Tarafa, the author of the Tarafa Sugar Restriction Act of 1924.

WORLD NITRATE SUPPLY

International Cartel.—In connection with nitrate, a raw material vital to American industry, an international agreement formed during 1929 is of interest to the United States. American agriculture is still dependent to a large extent on foreign nitrate sources for its supply of artificial fertilizers. Increasing production of synthetic nitrate in European countries resulted in severe competition with the natural nitrate supplied by Chile. In 1929 the total world production of synthetic and natural nitrate amounted to 2,365,000 metric tons, whereas the world consumption during the same period amounted to but 2,265,000 tons. In the course of the past year announcement was made of an agreement reached between the British (Imperial Chemical Industries, Ltd.), the German producers (I. G. Farbenindustrie A.-G.) and the Norwegian (Norsk Hydro) producers of synthetic nitrate, on the one hand, and Chilean producers of natural nitrate, represented by the Chilean Minister of Finance, Pablo Ramirez, on the other. The purpose of the agreement is to stabilize prices by controlling production and allocating distribution. The effect of the new agreement on the American market will be followed with keen interest by

American producers, distributors and consumers of artificial fertilizers.

THE COAL PROBLEM

The solution of the bituminous coal problem, where overproduction has been a matter of chronic complaint for many years, has made little progress during the year. Lack of leadership in general and of coöperation on the part of operators, miners, and the government authorities has thus far frustrated constructive action on a large scale. The existing situation was characterized in a recent address by U. S. Secretary of Labor, James J. Davis, as follows: "What happens now, every farmer, merchant, miner and operator here knows for himself. When there is no market for coal, mines shut down. When the workers have no wages, they cannot buy the farmers' products or the merchants' goods."

RUBBER

Revival of Restriction Scheme.—Since the collapse and suspension of the Stevenson rubber-restriction scheme in November 1928, renewed efforts have been made by rubber producers in the Dutch East Indies to establish a new organization for the purpose of controlling the world rubber market. At a meeting in Amsterdam in October rubber interests considered a plan for withdrawal of crude rubber from the market, and efforts were initiated to interest British rubber growers in the proposed stabilization scheme. As the United States constitutes by far the largest market for rubber, using about two-thirds of the total world consumption, the proposed restriction scheme is likely to result in further protective measures on the part of the American rubber consuming industries and the public generally.

THE WORLD DIAMOND MARKET

As a consumer of about 80 per cent of the world output of diamonds the United States has a practical interest in the control of the output and distribution of South African diamonds. Under the Precious Stones Act of 1927, new prospecting is forbidden and the Government of the South African Union is given control over the production of diamonds from alluvial sources. The Government allows only a limited portion of the supply to be marketed, and sees to it that a certain preëstablished price level is not affected. This governmental policy has greatly strengthened the position of the Diamond Syndicate, now composed of four concerns, of which the oldest and largest is the De Beers Company. South Africa controls 97 per cent of the total diamond output of the world, and the imports of diamonds into the United States amounts at the present time to approximately fifty-four millions of dollars per year.

INTERNATIONAL TRADE CONTROL

By Henry Chalmers

Chief, Division of Foreign Tariffs, Department of Commerce

TREND OF FOREIGN TARIFFS

Tariff Revisions.—Compared with the extreme unsettlement in the conditions of international trading during the first decade following the close of the World War, the year 1929 witnessed something of a lull. Fewer countries put into effect during the year general revisions of their customs tariffs than in preceding years, and these included very few of the major markets. However, tariff revisions are in various stages of preparation in quite a number of countries of Europe and of Latin America, indicating that the process of readjustment to the more or less settled postwar conditions is not yet over, and that the stage of relative stability in tariffs and other conditions of trading between nations is still to be attained. Changes in the duties on selected commodities, amounting in some cases to partial readjustments of the tariff schedule, occurred during the year in many countries, although these have usually been limited in the number of commodities affected. The limited nature of the tariff changes during 1929 was somewhat offset in a number of countries by the practice of bringing changes into operation frequently with little or no notice to the trade, with the consequent continuance of the state of commercial uncertainty.

Direction of Duty Changes.—The trend in recent years for tariff changes to be predominantly upward has in the main continued during 1929,—in most European countries and some of the British Dominions, primarily for protection; in Latin America and in the British colonies and China, primarily for revenue. However, the year has not been without a considerable number of duty changes downward, perhaps more frequently than has been the case in the years immediately preceding. Agricultural products have most often figured among the duty increases of the year; industrial products have been more prominent among the commodities upon which reductions of duty were made. Machinery, producers' equipment and materials have been with striking frequency the subject of duty reductions or even total exemptions, evidencing the desire of many governments to facilitate the expansion of domestic production in their countries, in agricultural as well as in manufacturing and occasionally in mining or construction.

Special Attention to Farm Products.—Farm products have been particularly prominent in the trade control legislation of many countries during the past year, especially those of Europe, reflecting the widespread condition of agricultural overproduction, and the earnest concern that is felt by many governments over the relatively disadvantageous position of their agricultural producers. The efforts to ameliorate the situation have taken various forms in the different countries, and a variety of exceptional devices for the control and stimulation of trade in agricultural products are being tried out. Aside from the usual first resort to increased duties against similar imports, the measures of relief being experimented with include a government monopoly on grain; insistence upon domestic flour containing a given proportion of domestic wheat; sliding scale tariffs on sugar and other agricultural products; and a system of import certificates issued upon the exportation of grains and certain other farm products.

MAJOR TARIFF EVENTS

General.—Since the majority of foreign countries made some changes in their import duties during the year, on selected commodities or on ranges of products, it is difficult to discuss them specifically in a brief review. It will be possible to include here little beyond the mention of the countries which put into operation during 1929 comprehensive revisions of their customs tariffs, with an indication of those countries in which revisions of fairly general scope are understood to be in preparation, together with a few other salient events.

Continental Europe.—Among the European countries, thoroughgoing tariff overhaulings were effected only in Rumania and Turkey, the first mainly downward and the second upward. The so-called revision of the Swedish tariff was largely one of form, and the Finnish revision consisted only of the annual group of selective changes. General revisions are reported in process or under consideration in Finland, Germany, Greece, Poland, Portugal, Spain and Yugoslavia. The special developments in European trade control measures as forms of farm relief, and the trend of the year in Europe in treaty negotiations and trade restrictions, are discussed elsewhere in this article.

British Empire.—In accordance with the custom in many British areas of introducing tariff changes once a year in connection with the annual budget, quite a number of Dominions and colonies effected limited changes in their import tariffs during 1929. The broad upward revision of import duties by Australia represents probably the only comprehensive tariff revision in the Empire. Important tariff changes are in prospect in two major British areas; in Great Britain, where the new Labour Government has declared for fewer protective duties, and in Canada where extensive hearings are being held before the Tariff Advisory Board. There were some small steps taken during the year, and larger projects agitated, for bringing about closer trade relations between the various parts of the British Empire and curtailing imports from foreign sources.

Latin America.—Guatemala was the only country of Latin America that put into operation during 1929 an actual comprehensive tariff revision, with changes both upward and downward. The new Mexican tariff is essentially a readjustment of the present schedule so as to consolidate with the duties the consular fee and the customs surcharge hitherto collected separately. Projects for general tariff revision have been prepared and are reported under way in Brazil, Colombia, and Peru. In the matter of duties or controls on exports, an important feature in buying from many countries of Latin America, the year was marked by numerous changes, particularly in Mexico, Guatemala, and Argentina. The establishment of an exclusive selling agency for the handling of the sugar crop by the Cuban Government was a feature of the year.

The Orient and Africa.—The first autonomous tariff of China, distinctly upward, was the outstanding revision of the year in the Orient. Japan made some changes, mostly downward, and has a general revision in prospect before long. In the Near East, a considerable revision of the Palestine customs tariff was noted, while Egypt announced an autonomous tariff to be effective as soon as the last of the present limiting treaties with the Powers expires in 1930.

COMMERCIAL TREATY NEGOTIATIONS

Treaties and Tariff Bargaining.—Well over one hundred commercial treaties or agreements were negotiated or made effective during 1929. While counterbalanced by a rather considerable number of treaties denounced or terminated, the year saw a substantial net addition to the arrangements by various sets of countries for the stabilizing and regularizing of the conditions of trading between their nationals. The majority of these treaties involved the various countries of Europe. This is natural in view of the great prevalence of differential tariffs on the Continent, necessitating definite arrangements in order to secure minimum rates of duty or the most favorable conditions of admission. However, the process of the reduction or binding ("conventionalization") of duties among the countries of Europe has been going on for a number of years, and it is not unlikely that the original tariff schedules have in most cases been brought to the level that the governments consider approximately their indispensable minimum. Whether for this reason, or because of the increasingly universal adoption of the broad most-favored-nation or tariff-equality principle—or whatever the explanation—it is notable that the granting of tariff concessions in the course of commercial treaties has been less frequent recently than in earlier years.

Most-Favored-National Principle.—The great majority of treaties of the year provide essentially for an exchange of most-favored-nation treatment in customs and related matters, with tariff adjustments downward as well as upward appearing to be made most often by autonomous action on the part of the individual governments. As a notable but rather isolated exception to the most-favored-nation principle, there appeared toward the end of the year the Swiss treaties with France and Belgium, reserving duty reductions made in the course of multilateral agreements of a certain specified type, an innovation obviously related to the current discussion of a possible European agreement for collective tariff reductions. The undertakings which were noted in a number of the commercial treaties of 1928, not to impede the trade with the other contracting country through the imposition of any prohibitions or restrictions on their imports or exports (beyond the usually recognized exceptions), have appeared with increasing frequency as a feature of the commercial treaties negotiated during the past year.

INTERNATIONAL CONFERENCES

Hide and Bones Restrictions Ended.—The year was marked by active discussions and increasing efforts for the collective handling of trade control problems, through simultaneous action by a number of countries along the lines worked out at international conferences. On Oct. 1, 1929, there were brought into operation as between seventeen countries of Europe the Geneva agreements for the abolition of restrictions on the exportation of hides and skins and of bones. An exceptional feature of these agreements is the undertaking for the removal of limitation of export duties on these products. This is the more exceptional because of the failure thus far of all proposals to carry the plan of collective action into the field of reductions of import duties on specific commodities.

Pact to End General Trade Restrictions.—The major Convention for the Abolition of Import and Export Prohibitions and Restrictions, worked out at the two Geneva conferences of 1927 and 1928, to which the agreements on hides and bones are subsidiary agreements, had been planned to be brought into permanent operation Jan. 1, 1930. Under this Convention, the participating countries are obligated to abolish as between each other all restrictions or prohibitions of an economic character on imports or exports, other than those specifically recognized or excepted in the Convention, within a period of six months from the date of its coming into force. The restrictions of this character still maintained in the various countries affect a wide range of producers, from growers of prunes to manufacturers of automobiles. It is clearly understood that the Convention does not affect the tariff systems of the treaty-making methods of any of the contracting countries. More than the necessary eighteen ratifications had been secured, but a number of them made their ratification conditional upon similar action by certain other governments, not all of whom have thus far ratified. The failure of Czechoslovakia and Poland to ratify, for various reasons, appeared the main difficulty. At a special Paris Conference in December, agreement was reached between the representatives of the nineteen ratifying countries, including the United States, upon temporarily designating Jan. 1, 1930, as the effective date of the Convention.

Hope for Permanent Operation.—Because of the difficulty mentioned, Jan. 1 is designated as only a provisionally effective date, in that any of the countries may withdraw from the Convention on June 30, 1930, if the two non-adhering countries named have not ratified by the end of May. The hope was, however, expressed by the leaders of the Conference that either the two particular countries would ratify within the period, or that the others would waive their right to withdraw and continue the Convention indefinitely in operation. When finally operative, the Convention is expected to result in a material liberation of international trading from what has come to be recognized as one of the worst forms of artificial trade barriers. Its value lies not only in the abolition of the various economic restrictions in the form of special licensing, quota, or other controls on foreign trade still existing in any of the contracting countries, but in the assurance it carries against the reimposition by them of what is being thus condemned as a disapproved device for the purpose of control of commerce.

"UNITED STATES OF EUROPE"

A project of far-reaching significance, hitherto mainly of theoretic interest, was brought closer into the realm of practical consideration by the declarations of M. Briand and others at the 1929 League of Nations Assembly urging the desirability of an economic federation among the European States. The objective of what is sometimes loosely referred to as a proposal for a "United States of Europe" is the gradual removal or scaling down of the many customs barriers now dividing the European Continent, and the establishment of as nearly as possible one large unobstructed economic area. The leaders of the movement regard this program as essential to the economic health and progress of Europe as a whole, under the changed conditions of modern competition. They declare the scaling down of European tariff walls the indispensable condition for the effective development of large-scale production in Europe, pointing out its dependence upon having a large consuming population within the producers' assured market area, with goods originating in any part of the area moving with considerable freedom from tariff hindrance over the whole of it. The objective as well as the organization envisaged seem distinctly patterned on the lines which are regarded as having been largely responsible for the remarkable economic progress and prosperity of the United States.

PROPOSAL FOR "TARIFF TRUCE"

The political as well as the economic difficulties in the way of consummation of such a scheme have become apparent in the course of study that has since been made of the projects to that end, and its actual attainment is coming to be generally recognized as at best an ultimate possibility. The only practical proposal that has thus far been put forward to the various governments has been the invitation of the League of Nations to an international conference early in 1930, to consider an agreement for a "tariff truce" among as large a number of countries as possible for a period of several years, during which time plans for future steps toward the mutual moderation of tariff barriers may be worked out.

COLLECTIVE EFFORTS ON AMERICAN CONTINENT

On the American Continent, the recent effort toward simpler and more liberal conditions for the movement of trade between countries has been mainly in the field of customs and port administration, and in the procedures in connection with the documentation and actual movement of goods between them. Considerable progress has been made in this direction during the last few years. Several of the Latin American countries have consolidated with the basic schedule of import duties the various customs surcharges, so much a feature of the tariffs of these countries. Others have transferred the collection of the consular fee for the legalization of shipping documents, which often is assessed as a percentage of the shipment's value, from the foreign exporter to the domestic importer, thus giving it its proper place as an additional customs charge.

SIMPLER CONSULAR AND CUSTOMS REGULATIONS

During 1929, six of these countries announced revised consular and customs regulations or codes, and all but one were efforts in the direction of greater simplicity and expedition of trade. The recommendations of the experts of the American Republics who participated in the Pan American Conference on Customs Procedure and Port Formalities at Washington in November, 1929, are expected to give impetus to this tendency for simpler and more uniform requirements and practices in these matters, irrespective of the degree to which the draft convention recommended by that Conference receives wide acceptance, as a whole, by the American Governments. This expectation arises partly from the evidence already apparent of the influence of the recommendations of the similar Pan American Conference on Consular Procedure of 1927, upon the builders of the revised consular regulations which have since been issued by various of the American countries.

NOTE: Discussion of the tariff situation in the United States during 1929 is outside the scope of this article, which is concerned with the measures of control of international trade on the part of foreign countries. Certain aspects of the American tariff situation are covered elsewhere in this volume.

PUBLIC CONTROL OF FUTURES TRADING

BY ARTHUR RICHMOND MARSH

COTTON BROKER AND PUBLICIST, NEW YORK

NEW COMMODITY FUTURES MARKETS

Extension of Trading.—During the past year no additional legislation has been enacted by Congress or by any of the State Governments in this country looking to an extension of public control over the futures markets for commodities; nor have there been any new departures of significance in the administration of existing law on the subject. The number of such markets was increased in the course of the year through the creation of organized exchanges in New York City for future transactions in hides and in burlap and allied jute products; while future dealings in copper and tin, initiated on the New York Metal Exchange late in 1928, were developed to the point of making the market for those metals an increasingly important factor in the country's metal trade. The list of essential commodities for which organized American futures markets are now in continuous operation is as follows: (1) The principal grains (wheat, corn, oats, rye and barley), together with certain staple meat products commonly described as "provisions"; (2) cotton; (3) cottonseed oil; (4) sugar; (5) coffee; (6) cocoa beans; (7) raw silk; (8) crude rubber; (9) hides; (10) minor metals (copper and tin). In the case of certain of these commodities two or more futures markets exist in different parts of the country, for example, the futures markets for cotton at New York, New Orleans and Chicago; and the futures markets for wheat and other grains at Chicago, New York, Minneapolis, as well as those upon a smaller scale at various concentration points scattered through the grain states.

Scope of Public Control.—No attempt has as yet been made to introduce the policy of public control of futures markets except in respect of the markets for cotton and those for the grains, in both which instances legislation has resulted principally from the insistence of large groups of farmers and their political spokesmen that the relatively low prices they were receiving for their products were in the main attributable to unwarrantable speculative and manipulative operations on the cotton and grain exchanges. Hence the enactment by Congress of the United States Cotton Futures Act and the United States Grain Futures Act, both of which are primarily aimed at the curbing of the activities of speculators and neither of which can be said to embody a broad and economically well considered program of public policy in this field.

GROWING SIGNIFICANCE OF FUTURES MARKETS

"Hand-to-mouth" Policy.—The importance of futures markets for commodities in both a commercial and a financial (or credit) sense has much increased in recent years by reason of the general adoption by merchants and manufacturers, not only in the United States but also in practically all foreign countries, of the so-called "quick turnover" or "hand-to-mouth" policy of conducting business, the underlying principle of which is that neither merchant or manufacturer shall purchase and carry stocks of goods or raw material in excess of the expected demand for a very brief period, a period regularly confined to a few weeks and often reduced to a few days. The effect of this new commercial practice upon the distribution of the products of agriculture (and to some extent the products of manufacture) has been far-reaching, since the costs and price risks incident to the carrying and financing of each year's supply of such products are no longer borne for the most part by the manufacturers and merchants in the several branches of industry and trade concerned with such products, but are either thrown back upon the producers or must be underwritten by that special class of persons commonly described as speculators or speculative investors. Actually, indeed, the producers of agricultural products are in no position financially to assume the burden of carrying their year's production for distribution as it is needed by domestic and foreign manufacturers from month to month through the entire year.

Rôle of Cotton Merchants in Marketing.—American cotton farmers are as a class so impoverished, having an average annual income of barely $300, that they are compelled to market the bulk of each year's cotton crop during the four or five months in which it is harvested, and this irrespective of the price they receive. In other words, with the world's cotton mills actually consuming not quite 1,300,000 bales of American cotton per month, the farmers in the South are forced to sell at least 12,500,000 bales during the five months from August to December of each successive year. The overplus of 6,000,000 bales sold by the farmers during this period must, under the new conditions, be taken care of by cotton merchants, who buy the cotton itself as it is offered but protect themselves by selling "hedge" contracts in one or more of the great cotton futures markets. Naturally, the principal buyers of the "hedge" contracts thus sold are speculators or speculative investors who believe that after the pressure of farmers' marketing is over the price of cotton may be expected to advance. In this wise the futures markets for cotton have come to play a greater part than ever before in the process of distributing the annual production of cotton in the United States, while a similar state of affairs obtains with respect to the distribution of the crops of all the cotton-producing countries in the world.

Need of Futures Markets.—What has just been said about cotton applies equally well to almost all the other great products of agriculture, whether foodstuffs or raw materials. In almost every instance their annual production is seasonal, that is, confined to a few months of the year; while the producers of them are as a rule financially unable to spread their marketing over the entire year in conformity with the demands of consumption month by month. Hence the need of futures markets resorted to by a wide range of trade and speculative interests to enable the merchant class proper to take over the supply of each product as the producers perforce market it, and thereafter to distribute it to consumers as they need it. The same principle holds true, though perhaps not to quite the same degree, with respect to many of the products of mining and even of manufacturing proper. Here, too, the consumer demand does not continuously and regularly coincide with the production, there being periods when the efficient operation of mines or factories necessitates a production in excess of the immediate demand, even though not in excess of the expected long-run demand. In such cases the use of futures markets as a protection against price risks renders possible some excess present production in anticipation of the prospective increased demand of the future; that is, gives to production a continuity which it could not otherwise have.

PROBLEMS IN FUTURES TRADING

Price Manipulation.—The steadily increasing use of futures markets, as described above, has undoubtedly given rise to certain distinctly serious problems, for which no solution has as yet been found through legislation or through the public control of the existing futures markets. Among these problems none is more important than that of preventing the manipulation of prices in each given futures market by large trade interests for their own pecuniary benefit, but to the detriment of the producers of the commodity affected, on the one hand, and of the respective trade at large in all its ramifications, on the other. The ease with which such manipulations may be conducted has been much enhanced by the rapidly increasing burden thrown upon the futures markets as a result of the "hand-to-mouth" buying practice of manufacturers and distributing merchants. As has been seen, this practice necessarily involves a very large gain in the volume of "hedge" contracts outstanding in the principal futures markets during the greater part of the year, and this condition affords opportunities for price manipulation which formerly did not exist. A notorious example of such manipulation is to be found in the course of the futures markets for cotton in recent years. Somewhat similar conditions are credibly reported as obtaining in the futures markets for wheat and the other grains. It cannot be said that these unfortunate developments have as yet been competently studied either by economists or by law makers; hence the Federal laws so far enacted altogether fail to correct them. It is certain, however, that widespread criticism of the futures markets for cotton and grain will continue until suitable remedies for the evils referred to are discovered and applied.

PUBLIC PROTECTION OF SECURITIES

By William R. Shands

Manghum & Shands, Richmond, Va.

LEGISLATIVE TRENDS AND CHANGES

General.—The close of 1929 finds the various states lined up practically as before with respect to securities legislation. Delaware, Nevada, and the District of Columbia continue without either Blue Sky Laws or Fraud Acts. New York, New Jersey, Maryland and Connecticut have their Fraud Acts; the remaining states have retained, subject to many changes and amendments, Blue Sky Laws, now better known as Securities Laws, of various types and provisions. Any one not in sympathy with the paternalistic idea underlying this type of legislation will, therefore, find but little solace in the present situation.

New Enactments and Amendments.—A summary of the changes that took place in the many laws regulating the sale of securities during 1928 seemed to indicate that legislation along such lines was becoming a little better adjusted to the conditions it was framed to meet and that accordingly, fewer changes were required. Securities legislation enacted during 1929, however, has shown the error of any such reasoning. During the year not less than nineteen states have effected changes in their laws, many of them enacting entirely new acts. It is interesting to note, in studying the new legislation, the many points of similarity in the various statutes, indicating a tendency towards uniformity, the dream of national securities dealers, and the study constantly being made by the several states, to develop legislation that will afford the maximum protection to the public while imposing a minimum burden on legitimate business.

STATE LEGISLATIVE ACTIVITIES

California.—Because of the importance of securities legislation to-day in the fight to eliminate fraudulent and worthless securities, it will not be amiss to get some idea of what the legislatures of the states did during the past year. More than two years ago the State Bar Association of California appointed a special committee to study the Corporate Securities Act of that state and to recommend needed changes. Later, when the State Bar of California was established, the latter organization continued the study already begun. This study no doubt led to the appointment of a legislative committee in 1929 to advise the legislature as to the necessity or advisability of legislation in relation to the sale of securities. The committee appointed reported, and several amendments in the Corporate Securities Act were passed. Among the changes effected were the grouping of exempt securities and exempt transactions, giving the commissioner additional powers in connection with certain examinations, amending the basis of fees, and amending the definitions of various terms used in the act. Before the close of the session, the legislature provided for the continuance of the legislative committee, with instructions that it be prepared to report further concerning needful and advisable securities legislation to the next session of the California state legislature.

Connecticut.—For some time Connecticut has had legislation requiring mining and oil companies, subject to some exceptions, to secure permits before selling their securities in the state, but had no general Securities Law. In 1929 it enacted a "Fraudulent Sale of Securities Act," which is what its name indicates, a Fraud Act. While probably prompted by the Martin Act of New York, it is not as comprehensive and doubtless will be less effective. Thus Connecticut will be the first to try together the two types of legislation, making its experiment worth watching.

Illinois.—The amendments were not of very great importance, except possibly one to take care of a recent court decision declaring that portion of the act vesting in the Secretary of State the power to fix the conditions of bonds required of dealers unconstitutional, and another adding a new stock exchange as being entitled to have its securities exempt.

Iowa has enacted an entirely new Securities Law, following rather closely the exemptions now found in many other States, and providing for registration of securities by notification in designated instances, and by qualification in others. The administration of the act remains with the Secretary of State.

Kansas, the first state to pass a Blue Sky Law, has also enacted an entirely new statute. The former act, passed in 1911, with few changes, remained in effect until the passage of the new measure. Other states which formerly adopted the Kansas type of law, had already departed from it. It has been known for some time that Kansas was considering a change and had prepared a draft of an act along the lines of the law prepared by the Committee on Uniform Sale of Securities Law, of the Commissioners on Uniform State Laws. The change was thus expected. The new act should prove far more effective and satisfactory than the old law under present conditions.

Michigan.—The legislature of Michigan gave the law of that state a thorough overhauling, amending considerably over half of the sections of the old law and adding several new sections. Essentially the law is the same.

Missouri.—The Missouri act is now entirely new. In its provisions as to exempt securities, exempt transactions, definitions, registration by notification, registration by qualification, the revocation thereof, and the registration of dealers and salesmen, the act resembles many of the other recent acts, and follows rather closely the Uniform Sale of Securities Act. Of particular interest in the act is the power of the commissioner to give warnings to the public concerning securities being sold, and the power to coöperate, when desirable, with securities officials of other States to promote so far as may be practicable uniform methods of procedure and administration.

New Jersey.—The New Jersey Securities Act, which in reality is a fraud act modeled along the lines of the Martin Fraud Act of New York, was by the recent amendments made more stringent. The act vests in the Attorney-General discretion to institute appropriate proceedings thereunder whenever he has reason to believe the law has been, is being, or is about to be, violated.

Ohio.—After much criticism, the former Ohio Securities Law has been repealed. In its place is an entirely new act. It is understood that many organizations in the state coöperated in the preparation of the new law in an effort to make it an efficient piece of legislation for the state. The new act is comprehensive and rather long, consisting of 48 sections.

Oregon.—Considerable change has been wrought in the Oregon law. The law now defines the words usually defined by the present Securities Laws, contains a list of exempt securities, increases the powers of the commissioner, and provides, in the discretion of the commissioner, for the registration for immediate permit, a procedure designed to effect somewhat the same result as elsewhere provided by registration by notification.

Other States.—Several sections of the Pennsylvania Securities Law were amended in 1929. Rhode Island made a small change. South Dakota added an exemption covering securities of corporations organized or doing business in that state, for the purpose of drilling for petroleum, oil, gas, mining, metallurgical plants, or other development of the mineral resources of the state, provided the exemption is claimed in accordance with law. In Washington the administration of the act has been transferred from the Secretary of State to the Director of Licenses. West Virginia, New York and Wisconsin also made minor adjustments in their laws. Many amendments were made in Utah to strengthen the law. In Vermont an entirely new act, modeled along the lines of the Investment Bankers Association Bill, was passed to supplant the former law regulating investment companies. The new Vermont act is to be administered by the Commissioner of Banking and Insurance. It is in line with many of the other new statutes and provides for exempt securities, exempt transactions, registration by notification and qualifications, and other such features. In both South Dakota and Washington a repeal of existing Securities Laws was advocated, but the legislatures were unwilling to withdraw the protection afforded the public by these acts.

PENDING LITIGATION

Individual Rights.—Another development of Securities Legislation has been the large amount of litigation now going on concerning such laws. A short while ago most of such litigation pertained to prosecutions of alleged violators of the several acts, the principal question being the constitutionality of the acts involved. Today the litigation to some extent covers like questions, but to a greater extent than ever before it involves the rights of individuals towards one another under provisions of the acts. Where once we found the state conducting prosecutions, in addition thereto we now expect to find individuals asking for the rescinding of contracts made in violation of the securities laws. A recent case along this line involved the validity of a contract made in one state in violation of the Blue Sky Law of that state when sued upon in another state.

Interpretation.—A recent California case indicated the difficult question honest promoters are now constantly called upon to decide, that is whether a particular Blue Sky Law applies to the security or not. In that case after being turned down by the Commissioner, the court was asked to give declaratory relief. This it refused to do, saying that the decision of the Commissioner alone might be appealed from. Those states that experience this trouble in interpreting their regulations might study the provisions of the present Virginia Securities Act, which provides for an application being presented to the administrative body to determine whether a designated security need be qualified before being sold or offered for sale in Virginia.

STATE AND EXCHANGE COÖPERATION

Exemptions and Standards.—The desire and ability of the well organized stock exchanges to eliminate fraudulent securities and practices from their listings, has been recognized by a majority of the states having the Blue Sky type of legislation. These states have exempted from the provisions of their acts securities listed on certain designated exchanges that meet the required standard. Certain of the larger stock exchanges have secured widespread recognition. The small exchanges have in many cases been recognized in their local laws.

Surveys of Exchanges.—In line with this policy, there was formed at the Eleventh Annual Convention of the National Association of Securities

Commissioners, held in Salt Lake City, Utah, a Stock Exchange Committee, composed of three State Securities Commissioners, to make a survey of the entire field of activity indulged in by the various stock exchanges in the United States. Pursuant to its authority, the Stock Exchange Committee has proceeded to examine the New York Curb Exchange and the San Francisco Stock Exchange, and reports of its findings have been prepared, printed and distributed. If the work of the committee is thorough and kept to a high standard, much duplication of effort and expense will be avoided by the acceptance on the part of the various states of the reports prepared as sufficient evidence on which to base their individual decisions recognizing or refusing to recognize the different exchanges involved.

CONCLUSION

These and many other developments indicate quite clearly that practically all of our states are definitely committed to the theory that it is the duty of the government to protect the public from fraud in the purchasing of securities. To perform this duty efficiently is by no means an easy task. In checking the fraudulent promoter, legitimate business must not be choked out. It will therefore be interesting during the next two years to see from the results achieved whether the volume of securities legislation enacted during recent years is meeting the responsibility which government has assumed.

INVESTMENT TRUSTS IN THE UNITED STATES

By Leland Rex Robinson

President, Second International Securities Corporation

EVOLUTION OF THE INVESTMENT TRUST

Company Growth. — Investment trusts, practically unknown as such in the United States as late as 1921, have become within the last five years an important factor in American finance. Instances can be cited of several companies and funds, mostly of a small and purely local character, which can be properly termed "investment trusts," and which antedated 1921, and even the war. Moreover, a few well known companies, originally organized to pursue a different business are now functioning substantially as investment trusts. This group includes Overseas Securities Company, whose predecessor corporation dates from 1920 and which represents the evolution of a finance and investment company into an investment trust company in the more restricted sense; American International Corporation, organized in 1915 as a finance, holding and trade development company throughout the world, which is now confining its activities for the most part to investment rather than to finance or control; and Adams Express Company, organized in 1854 to conduct a railway express business, which under stress of subsequent developments, is now purely an investment company.

Proper Use of Terms.—The popularity of the term in the United States has led to confusion, in the public mind, of every type of investment and security company, as well as finance, holding and operating companies, with the more strictly delimited investment trusts. Several investment and security holding companies organized in the first decade of this century, like Electrical Securities Corporation and Railway and Light Securities Company, might perhaps have been properly called "specialized investment trusts." However, there is no legitimate reason for so classifying the many powerful finance, operating or holding companies which during the decade and a half before the war played so powerful a rôle in the development of public utilities and of gas and electric power. Or, again, it is no more accurate to refer to a holding company controlling a chain of banks as an "investment trust" than it would have been so to label the earlier Standard Oil Company of New Jersey, or the old American Tobacco Company, which fell under the adverse Supreme Court decisions of 1911.

Definition.—A workable definition of "investment trusts" is therefore essential in appraising the American movement, and in what follows, this term will be so employed: "An investment trust is an agency by which the combined funds of different participants are placed in securities showing a distribution of risk such as to introduce the 'law of average' in protection of the principal. Furthermore, the investment trust aims solely at the safe and reasonably profitable employment of the subscribed investment funds while definitely avoiding those responsibilities of control, management or finance which are sometimes tied in with investment."

VARIETIES OF INVESTMENT TRUSTS

Structure and Functions.—A brief view of this definition will show that many varieties of investment trusts may be included. The investment trust may be a corporation; a common law, or Massachusetts, trust; a trust fund established under provisions of an indenture; or an informally operated investment pool. The funds for investment may be derived from sale of beneficiary shares; participating certificates; ordinary corporate common shares; "share units" consisting of common and preferred shares united in one offering; preferred shares of different types; bonds, debentures or notes. The investment policy followed may be the purchase, once and for all, of a group of stocks or bonds rarely if ever changed, or the active supervision of the holdings in what may on occasion amount to a continuous process of investment and reinvestment. The distribution of risk effected may be very broad, or it may be limited to one industry, one type of issuer, one country or area, or to stocks exclusively, or to bonds. In several vital respects, however, all these trusts, funds and corporations properly termed "investment trusts" are similar,—distribution of risk being one common element—while they differ markedly from finance, holding and management companies in avoiding the activities for which these latter are primarily created.

"Contractual" Types.—A helpful guide in distinguishing among the several kinds of investment trusts lies in setting apart the "contractual" from the "direct" or the "statutory" groups. The former, of less importance both as regards numbers and available investment funds, are those investment trusts (here using "trusts" in the technical legal sense) set up under indentures, or contracts, between trust companies holding physical and legal possession of trusteed securities and/or cash, participation in which is evidenced by convertible certificates authenticated by the trustees; "depositor corporations," which exchange the securities and/or cash for the certificates of beneficial interest recognized by the trustees, and market these among investors; and the purchasers of the certificates who in the act of buying become third parties to the contract. These contractual investment trusts may be created under the terms of indentures which define in each particular the "units" of securities to be deposited in exchange for every 1,000 participating shares ("unit series"); or the indentures may provide for the issuance by the trustee of beneficial shares of one or more kinds if and when certain amounts of cash, or cash equivalents in securites, are deposited with the trustee ("fund series"). The indenture agreements under the terms of which the contractual investment trusts are set up may require that the securities originally deposited with the trustees are not to be changed ("fixed"); or they may permit continuous supervision of the trusteed investment funds under limitations more or less broad, embodied in the indentures ("supervised").

Uniform Trust Funds of Banks.—Another type of contractual investment trust is to be found in the uniform trust funds established by several New York City banks, such as the City Bank, Farmers Trust Company, the Brooklyn Trust Company, and the Irving Trust Company (through Irving Investors Management Company, successor to Investment Managers Company). These are facilities offered to clients of the banks who are willing to have their funds comingled with the funds of many others in a joint trustee account invested and reinvested, at the discretion of the investment officers of the banks, with a minimum of the restrictions to which trustees are usually subjected. Each participant, in effect, creates an "express, revocable trust," as his certificates are convertible at their current values upon surrender under the terms given in the agreements.

Incorporated Investment Trusts.—As over against the contractual investment trusts may be set the "direct," or "statutory" group. Most of these are corporations organized under the laws of the different states, although a few of them, functioning essentially like corporations, take the legal form of common law, or Massachusetts trusts and should technically be referred to as "trusts." Such investment trusts are in the "statutory" group because they are organized and operated under the general acts of incorporation, or, in the case of those few trusts taking the form of common law, or Massachusetts trusts, under the court decisions and common law principles which, as modified by occasional statutory enactments, determine the status of legal entities of this kind. The term "direct type of investment trust" has a somewhat different significance, but may be used interchangeably with "statutory." Unlike the contractual trusts, which are constituted by virtue of terms of a special agreement or indenture applicable only to the trust in question and to which the trustee is a party, the "direct" investment trusts require no trustee intermediary as an essential condition of their operation. They receive directly from the public the capital derived from sale of their own shares, debentures or bonds; own outright in their own name all cash and securities; directly invest and reinvest their funds in accordance with self-imposed restrictions, if any, contained in charter, by-laws, directors' resolutions, or special indentures securing bonds or debentures; and employ banks or trust companies to act as registrars, transfer agents, custodians, or safekeeping agents for a part or all of their securities, or as trustees under the terms of indentures conditioning the issuance of their bonds or debentures. Some of the incorporated, or Massachusetts trust, investment trusts (the "direct" or "statutory" type) issue only one class of capital stock or beneficial shares; the majority issue more than one class of capital stock and/or bonds, debentures or notes. Some of them are under an active management and even approach the functions of trading corporations in the facility with which they enter into, and withdraw from different investment situations. Others are much less active in altering their major investment postions to accord with estimated market changes, although their investments are under continuous supervision. For a detailed discussion of the classification of investment trust funds and companies of all kinds, see *Investment Trust Organization and Management* (Leland Rex Robinson, Ronald Press, New York. 1929 Edition, Chapter 2, pages 31-48).

AMERICAN INVESTMENT TRUSTS IN 1929

Importance of Period.—It may be observed that the year 1929 has been in many respects one of vital importance. It has witnessed the period of greatest growth, as well as the most severe testing to which investment trust funds and companies, as well as the many different kinds of holding, finance and management corporations, often mistakenly referred to as investment trusts, have been subjected.

Paid-in Capital.—Last January the total paid-in bond and share capital of publicly owned American investment trusts, using the term in its proper meaning, amounted to approximately $1,100,000,000. Of this figure, the outstanding preferred stock totaled in the neighborhood of $460,000,000; the debentures and bonds were approximately $200,000,000; common stocks were $360,000,000; and beneficial certificates issued through trustees acting on behalf of contractual or common law investment trusts brought up the figure by the amount, roughly, of $80,000,000 more. No later compilation on this same basis has been made, and for this reason we are unable to compare the foregoing figures, which were arrived at as the result of careful analyses, with those at the present time. Probably the best general guide would be the figures of public financing prepared monthly by the *Commercial and Financial Chronicle*, whose tables show that for the first ten months of 1929 a grand total of $2,440,000,000 is reported for "investment trusts and trading and holding companies" of which, as might be expected, over 95% was in stocks. The greater part of all this capital was obviously raised for finance, trading, and holding companies, rather than for investment trusts, and it is most unfortunate that clear thinking on these matters has been obscured by the easy habit of lumping together such radically different companies, funds and common law trusts. It is probably not far from the truth to say that, as over against aggregate American investment trust capital of about $1,100,000,000 in the first month of this year the grand total has now been advanced to a figure between $1,500,000,000 and $1,750,000,000. Furthermore, the ratios of outstanding debentures and bonds, preferred and common stocks have undergone a decided change in the direction of larger paid-in equities. It is probable that of the entire present paid-in investment trust capital from all sources at least 55% has been derived from the sale of common stocks, shares or certificates of beneficial interests as over against only 40% or so from the same source at the beginning of the year.

INVESTMENT TRUSTS AND THE STOCK MARKET

Performance During Depression.—The great majority among the two hundred or more American investment trusts whose shares or certificates are held by the public appear to be in satisfactory financial condition despite the brief period of existence covered by many of them. Many stockholders, or owners of investment trust certificates, have doubtless been keenly disappointed to discover that such securities do not carry in themselves any magic powers of immunity from overwhelming market forces; while numbers of investors in investment trusts, like purchasers of bank, utility, or industrial stocks, have lost heavily by ill-advised marginal operations or bank borrowings. In other words, investment trust stocks as a group during recent months have been in much the same position marketwise as other listed and unlisted securities. Nevertheless, a careful check of actual results makes clear the great advantages which have accrued to those placing their funds in properly sponsored investment trusts.

Relations to Share Prices.—Some writers have blamed the stock market crash upon "investment trusts"; while others have registered surprise and alarm that the same institutions were unable, or unwilling, to block the downward tide. It must be obvious, however, that available cash resources aggregating only from a half billion to a billion dollars in cash or call loans of investment, trading and financial companies could not have stemmed such a torrent, even though the managers might have been foolhardy enough to throw their entire disposable funds into the buying of stocks after the markets struck only their first "air pockets." On the other hand, it is equally plain that the withdrawal of several hundred million dollars from call loans and banks for the purchase of stocks on the sweeping declines witnessed in October and November must have contributed materially toward the restoration of public confidence, however disturbing to the banks may have been at the time the necessity for a quick replacement by their own loans of a part of the funds withdrawn by "others" from the call market. Finally, it is worth observing that to the extent abuses or careless practices will have proved to undermine the position of companies suffering heavy depreciation from unwisely timed investments, unsound accounting methods, or unhealthy pyramiding of paper values, this shortsighted management will become increasingly a thing of the past.

PRINCIPLES OF SOUND MANAGEMENT

Such difficulties as have been encountered have arisen from needless neglect of clearly understood principles in the operation of investment trusts. Those funds and companies which have best withstood the market shocks of late 1929 owe their favorable position to one or more of the following policies: (1) wide distribution of risk among investments, involving bonds as well as stocks, representing a wide range of issuers, and often originating in other important industrial and financial countries than the United States; (2) continuous competent supervision of the investment holdings with no ulterior motives beyond the maintenance of the soundest possible investment position; (3) capital structure consisting wholly of capital stock, or of capital stock preceded by senior securities in such conservative ratios (as compared with the common paid-in equity) that the prior charges have been kept well within reasonable expectation of interest and dividend yield; (4) avoidance of bank borrowing, except in moderate amounts, and for purely temporary purposes; (5) maintenance of liquid position by confining investments mainly to high-grade, seasoned and marketable securities, and by holding reasonable proportions in the form of cash or call loans in order to take advantage of buying opportunities during periods of depression; (6) proper accounting at regular intervals; (7) sufficient size to permit the overhead required for capable management; (8) compensation arrangements for organizers or managers which are a matter of public record, simple in construction, and fair both to the public and themselves; (9) refusal to divert investment capital towards the salvaging of critical situations in the market for their own issues, or towards the maintenance of artificially high market quotations thereon; (10) offering of their shares at prices which bear careful analysis as regards book values and earnings, realistic appraisals of underlying securities, and reasonably low distribution outlays; and (11) constant emphasis upon the importance of accumulating reserves out of current cash earnings.

THE OUTLOOK

No doubt many smaller companies, realizing more and more the difficulties of proper investment supervision without a large enough volume of capital to permit the employment of full-time staffs, will merge among themselves, or with some larger organization, or will enter into supervision contracts of one kind or another. This massing of investment funds will add greatly to the efficiency of management, and strengthen and broaden the markets for investment trust securities. The quality of sponsorship for the investment trust movement will be raised even above present standards by the greater interest of leading banks and reputable banking firms. The notable progress made by several of the former in the improvement and extension of their various uniform trust funds should be continued in the new year, while the further study of estate administration, inheritance problems, and living trusts should make stronger the cooperative ties between insurance companies and banks on the one hand, and ably administered investment trusts and banks on the other. The next few years will probably be a period of stabilization, standardization, and progress, in part through processes of trial and error. Whatever may be the experience during these formative years in the development of American investment trusts, the censensus of informed opinion points to the permanent and important place which these institutions are bound to occupy in our financial life.

BANKING AFFAIRS

By Gurden Edwards

Secretary, Economic Policy Commission, American Bankers Association

BANKS AND RESOURCES

General.—There were 25,330 banks of all classifications in the United States on June 30, 1929, with aggregate resources of $72,173,000,000. This was a decrease of 883 banks as compared with the number on the corresponding date in 1928, and a rise of $599,000,000 in point of resources. These data reveal that the decrease in numbers was at a greater rate than recorded for the change in this item last year while the increase in resources was at a considerably less rate. Aggregate capital, surplus and undivided profits of American banks on the given date amounted to $9,810,000,000, a rise in a year of $828,000,000 in these items. Total deposits were $57,911,000,000, a decrease of $503,000,000, as compared with an advance of $1,677,000,000 recorded for this figure the previous year.

Trend in Deposits.—This change in the direction of developments in bank deposits was one of the outstanding banking phenomena of the year and was attributable to such factors as the practice of many individual and corporate depositors to withdraw funds from the banks for direct loans to the call money market and also a tendency for many corporate lenders to raise cash by issues of securities instead of by the method of bank loans or discounts which would have been reflected in the deposit liabilities in the banking figures. A chief factor, also, was the withdrawal of savings deposits for stock speculation.

Classification of Banks.—The official reports on banks by classes show there were 7,536 national banks, a drop in the year of 155 in this class; 14,437 state chartered commercial banks, a drop of 641; 1,608 trust companies, a drop of 25; 747 stock savings banks, a drop of 44; 611 mutual savings banks, a drop of 5; and 391 private banks, a drop of 13. These figures show that every class of bank suffered in the general shrinkage in numbers.

CHAIN BANKS

Resources of Group Systems.—Consolidation of banks into larger units both in city and country districts continued to be a major development in banking during 1929, resulting in giving the nation larger and stronger banking institutions on the average. A special phase of this concentration movement, and one that gave material for the most spectacular events and disclosures in the field of banking developments during the year, was the growth of group or chain banking, the plan whereby a number of banking units, with their own capital and operating personnel, are brought under the common control of a dominant bank, corporation or individual. The Economic Policy Comnission of the American Bankers Association published figures showing that over $13,000,000,000 in bank resources were included in such chain and group banking systems, numbering 273 organizations and comprising 1858 banks. R. S. Hecht, President of the Hibernia Bank and Trust Company, New Orleans, Chairman of the Commission, told the general convention of the Association that these figures indicated that almost 7½ per cent of the nation's banks and over 18 per cent of its banking resources were "enmeshed in the great net of chain banking that now covers almost every part of the country."

Chain Banking Classification.—The report showed that there were 78 groups, involving 407 banks including the head banks and representing about $6,473,000,000 in combined banking resources, in which the dominant element was a particular bank exercising direct or indirect control; 28 instances, involving 380 banks and nearly $5,335,000,000, in which a nonbanking holding company, not subsidiary to any particular bank, was the dominant element; and 167 groupings in which the dominant control was exercised by individual persons or groups of individuals acting for themselves, comprising 1071 banks and representing about $1,468,000,000 in aggregate banking resources. Some of these systems comprised 50 to 100 banks each. The total involved over $13,275,000,000 in aggregate resources and chain head offices were reported as operating in all but nine of the forty-eight states and the District of Columbia. The sale of additional independent banks to these chains was reported almost daily.

President Hoover on Group Banking.—The growth of chain banks led President Hoover in his annual message to Congress to comment on the movement, raising the questions whether it would lead to a dangerous concentration of the control of credit and threaten the independent local banking system or whether it meant, on the other hand, stronger support to banks through groupings that would bring metropolitan banking strength to rural districts. He suggested a commission to study this question and the proposal, put forward by the Comptroller of the Currency, for broader branch banking privileges for national banks on the basis of the trade areas in which they operate.

Position of Comptroller of Currency.—The position of the Comptroller was that such a policy would do away with the need of the chain bank method of reaching out to create stronger bank conditions in rural districts, would lessen the danger of bank failures and would stop the defection of national banks from the national system to the state bank systems with their more liberal operating advantages, by making national charters more desirable.

BANK FAILURES

Liabilities Involved.—During the year ended June 30, 1929, it was reported that 561 banks of all types were placed in the hands of receivers with total liabilities of $197,200,000, as compared with 484 banks in the previous corresponding period, with $158,700,000. The Comptroller pointed out that in the 9 year period 1920-29 about 5,000 banks throughout the United States with $1,500,000,000 in deposits had closed, mostly in the country districts.

Remedial Measures.—The fact that the banking profession was awake to this situation and diligent in seeking remedies was evidenced by activities fostered by the American Bankers Association, and many of the state bankers' associations aimed at bringing about a greater prevalence of scientific bank management. The national association pressed its work of educating bank people in the technique of banking, announcing that over 42,000 young bank men and women bank employees were now enrolled in the courses of its American Institute of Banking. It also held regional bank management conferences under the lead of the President, Craig B. Hazlewood, which were attended by thousands of mature bankers seeking better management methods, and it inaugerated national analyses of successful banking methods and distributed the results in published forms applicable to the practical operations of all banks.

SAVINGS ACCOUNTS

Depositors and Savings Decreases.—A somewhat startling announcement during the year was that the first recession in the nation's savings account in banks in the 20 years during which records in this field have been kept by the American Bankers Association was disclosed in the annual compilation of savings by that organization's Savings Bank Division. The shrinkage in savings amounted to over $195,000,000, on the basis of figures for the year ending June 30, 1929, whereas the year previous the similar report announced an increase of over $2,300,000,000, the largest ever recorded. The number of savings depositors also decreased during the year covered by more than 500,000 accounts. The lure of the stock market and affiliated activities were cited as part of the explanation for these changes. The statement showed that savings deposits in banks and trust companies of continental United States on June 30, 1929 stood at $28,217,656,000. A total of 52,664,127 savings depositors was reported as against 53,188,348 the previous year. Savings deposits per inhabitant for the year were placed at $235, which was $2 less than the per capita the preceding year.

Analysis of Decline.—A regional analysis of the drop in the nation's savings deposits in banks as made by the American Bankers Association revealed that all sections of the country except the New England and the Pacific States groups recorded losses. The six New England states as a group gained more than $88,800,000 in savings and 152,984 in savings depositors. The seven Pacific states as a group gained over $79,000,000 in deposits and nearly 278,000 in number of depositors. The gains in these two sections, however, were smaller than the gains recorded there the previous year. The sections which showed losses were the Middle Atlantic States, Southern States, East Central States and the West Central States.

BANKS AND THE STOCK MARKET

Rôle of Non-banking Loans in Crisis.—An especially notable incident of the banking year was the part the banks played in connection with the greatest stock market crisis of the nation's history that occurred in the fall. This emergency tested the ability of the banks, particularly of the relatively small group in New York City most closely associated with stock market finance, to stand the stresses and strains of an unprecedented credit situation. This situation was created by the so-called "boot-leg" loans to the call money market by which a large part of the speculative stock market inflation was financed,—more formally called "loans for others,"—that is, loans placed largely through the banks for non-banking lenders direct and not under the banks' own control or discretion. At the peak these "loans for others" amounted to $3,941,000,000. This was on October 9. When trouble began in the stock market and the quoted values of the collateral securing these loans began to crumble these non-banking leaders precipitately called their loans. By Nov. 20 this item was reduced to $2,031,000,000, a drop of $1,910,000,000. This meant that, in the confusion of a panic market and the relentless calling of loans, the New York banks had to take over more than $1,000,000,000 of this shifting credit. It was a trying situation, but the banks proved fully equal to the emergency both in skill and resources and passed through the test without any weaknesses developing in the banking structure. The unstable element of "loans for others" was vastly reduced and the call money market phase of the credit situation with its important collateral influences was brought once more under the control of the banks with their greater degree of discretion and responsibility for the general financial situation.

The Bank Situation and Outlook.—When the Hoover economic conferences convened at Washington to consider means to save the nation from the usual disastrous aftermath of the stock market crash, John G. Lonsdale, President of the American Bankers Association, reported as the representative of the banking business as follows: "American financial institutions stand as firm, as sound, as ready to finance the activities of industry and trade as at any time in their history. There are problems, but no weaknesses in the banking structure. There is now no strain on bank credit, as shown by the substantial easing of money rates and the rapid return of the money situation toward normal. There is ample bank credit available for financing the activities of industry and trade. The banks are prepared for constructive expansion and will do their part. Similarly, if at any time there are moderate recessions in any line due to seasonal or other fluctuations, the banks likewise are prepared for these. Commercial loans are not overextended through the carrying of inflated manufacturing and trade inventories as they were some seven years ago when deflation and stagnation meant frozen credit, expanding loans to carry business in distress, money stringency, the difficulties of collapsing prices, distressed selling and heavy losses through failure. There are to-day no such unsound underlying conditions. As long as general business continues reasonably active and goods move into consumption so that bank credit will be liquidated in its normal cycles, there is nothing to fear from these directions. While financial conditions as a whole are strong a word of caution must be expressed concerning too much expectancy of cheap money. Easy credit is not in itself a solution to all difficulties. Easy credit wisely used is a help, but unwisely used, a hindrance and not a constructive force. Our financial agencies, fully supporting all efforts in the direction of stabilization and expansion of business, appear resolved to resist unwise anticipations that credit will be available for any but well planned and reasonably conservative business ventures."

AMERICAN BANKERS ASSOCIATION CONVENTION

The American Bankers Association, the national organization of banking, with a membership of over 20,000 national and state commercial banks, trust companies and savings banks comprising over 90 per cent of the nation's banking power, held at San Francisco in 1929 its fifty-fifth annual convention at which leading topics of discussion related to the rapid development of chain bank organizations, means for further improving banking methods and management, the development of more scientific and professional elements in banking, promotion of regional clearing house organizations and examination systems and the defense of banks against discriminatory taxation. Cleveland was designated as the meeting place for the 1930 convention. The general officers of the Association elected for 1929-30 were, President, John G. Lonsdale, President Mercantile-Commerce Bank and Trust Company, St. Louis; First Vice President, Rome C. Stephenson, Vice President St. Joseph County Savings Bank, South Bend, Indiana; Second Vice President, Harry J. Haas, Vice President First National Bank, Philadelphia, Pennsylvania; Treasurer, Grant McPherrin, President Central National Bank and Trust Company, Des Moines, Iowa; Executive Manager, F. N. Shepherd, American Bankers Association, New York City.

THE FEDERAL RESERVE SYSTEM

By E. A. Goldenweiser

Federal Reserve Board

CREDIT POLICIES

1929 Developments.—Banking history of 1929 can be divided sharply into two periods of unequal length, the first extending from the beginning of the year to the third week of October and the second to the end of the year. The earlier period was characterized by a continuation of firm money conditions caused by the ever-growing demand for credit from the securities market and by the firm money policy pursued by the Federal Reserve System with reference to this demand. The latter period, which followed upon the most severe drop in security prices in the history of the country, was characterized by a decline in money rates and relaxation of the System's firm money policy.

Firm Money Course.—As early as November, 1927, the Federal Reserve System began to exert an influence toward firmer conditions in the money market, a policy adopted in view of the fact that the demand for credit to finance the trading in securities was constantly increasing while there was little growth in credit requirements of trade and industry. The policy was expressed first by allowing a large amount of gold to leave the country without replenishing the reserves of the member banks through the purchase of securities, thus making it necessary for these banks to borrow an equivalent amount from the reserve banks. Furthermore the reserve system sold United States securities out of its portfolio, thus causing member banks further to increase their indebtedness. Discount rates at the reserve banks were increased during 1928 from 3½ per cent to 5 per cent in eight districts and to 4½ per cent in the four Western agricultural districts. In 1929 the rates in these four districts were also advanced to 5 per cent. The reserve banks' buying rates on acceptances were also advanced and in the early part of 1929 were maintained above the discount rate, with the result that the system's bill holdings declined to the lowest level in five years. As a consequence of all these developments, member bank indebtedness to the reserve banks in the middle of 1929 constituted about 80 per cent of the total volume of reserve bank credit, the largest proportion in recent years. The high level of member bank indebtedness exerted an important influence toward firm money conditions.

Reserve Board's Warning.—In addition to these methods of discouraging undue expansion of security loans, the Federal Reserve System in February, 1929 issued a statement reminding member banks individually that continuous indebtedness at the reserve banks accompanied by a growth in open-market loans on securities or by the maintenance of a large volume of such loans was not in accordance with the spirit of the Federal Reserve Act. The intent of this Act was to create a system of reserve banks to take care of seasonal and emergency needs of member banks, and not to furnish them with funds for profitable use in the money market.

Non-banking Credit Sources.—As a consequence of the system's firm money policy, there was little growth in member bank credit between the middle of 1928 and the middle of 1929. During this period there was some growth in security loans of member banks and in their commercial loans, but there was a corresponding liquidation in their investments, and the level of their total credit outstanding remained relatively constant. Demand for funds by the security market continued strong, however, and was supplied largely from non-banking sources. Between July, 1928 and July, 1929, loans to brokers and dealers in securities placed by reporting member banks in New York City increased from $4,200,000,000 to $5,800,000,000, and of this increase more than $1,100,000,000 was accounted for by a growth in loans for account of non-banking lenders.

Conserving Banking Resources.—In August, 1929, in line with the system's policy of conserving banking resources, the discount rate at the Federal Reserve Bank of New York was advanced to 6 per cent. In order to facilitate the movement of crops to market, however, the buying rate on acceptances was reduced from 5¾ to 5⅛ per cent. In the following months reserve bank holdings of acceptances increased by an amount not only sufficient to meet the seasonal requirements for currency but in addition considerably to reduce the volume of member bank indebtedness at the reserve banks. Member bank credit increased during that period, partly in response to seasonal requirements, but also in part in response to the demand for credit from the security market. The larger part of this demand, however, continued to be supplied from non-banking sources.

BANKS AND THE STOCK MARKET

Effects of Drop in Security Prices.—In the last week of October, security prices, which had been rising almost continuously since the spring of 1926, but had receded since the early part of September, 1929, showed a drop of unprecedented severity. Banking developments after that date have been largely in the nature of readjustment of the banking position to the situation which had been changed by the drop in security prices. This readjustment can best be followed in the figures for member banks in New York City. Loans and investments of these banks increased in the week of Oct. 30 by $1,400,000,000, this increase representing largely the assumption by these banks of loans which had previously been made by out-of-town banks and non-banking lenders, as these lenders withdrew funds from the call loan market. Continued liquidation of brokers' loans in November, however, was reflected also in reduction of security loans by the New York York banks for their own account. Changes in the position of the New York banks during the five weeks ended November 27 are shown in the following table:

CHANGES IN POSITION OF REPORTING MEMBER BANKS IN NEW YORK CITY

(In Millions of Dollars)

	Oct.23 to Oct. 30, 1929	Oct. 30 to Nov. 27 1929	Oct. 23 to Nov. 27, 1929
Loans and investments ..	+ 1,391	− 823	+ 568
Loans on securities	+ 1,200	− 1,128	+ 72
To brokers	+ 992	− 1,238	− 246
To others.	+ 208	+ 110	+ 318
All other loans	+ 92	+ 106	+ 198
Investments ..	+ 98	+ 199	+ 297
Reserves with the Federal Reserve Bank	+ 243	− 201	+ 42
Borrowings from the Federal Reserve Bank	+ 129	− 137	− 8

Loans Taken Over by Banks.—Of the $1,200,000,000 of security loans taken over by the New York banks in the last week of October, about $1,000,000,000 were loans to brokers, and $200,000,000 loans to customers. During the four weeks following, loans to brokers by these banks were liquidated to the amount of $1,240,000,000, and the volume of these loans was reduced to an amount smaller than had been recorded at any time since January, 1926, when figures for such loans first became available. This liquidation was, however, accompanied by a further increase of other security loans, and by increase in other loans, including loans for commercial purposes, and in investments. The net result of changes between Oct. 23 and Nov. 27, was an increase of $570,000,000 in total loans and investments of these banks. No increase of indebtedness at the Federal Reserve Bank is shown over this period, as Federal reserve funds required to cover the increase in reserve requirements reflecting the growth in deposit liabilities were made available through security purchases by the reserve banks. The decrease in the demand for funds to cover speculative security accounts, and the low level of indebtedness of the New York banks at the reserve bank, were factors in the reduction of open market money rates. Buying rates for acceptances were reduced from a range of 5⅛ to 5½ per cent to a range of 4 to 4¼ per cent, and the discount rate at the Federal Reserve Bank of New York was reduced from 6 to 5 per cent on Nov. 1, and to 4½ per cent on Nov. 15. Discount rates at the Federal Reserve Banks of Boston, Atlanta, Chicago, and San Francisco were also reduced from 5 to 4½ per cent.

An increasing demand for security loans and for other loans at banks outside New York City in this period was met largely by use of funds withdrawn from the security market and by further liquidation of investment holdings, with the result that total loans and investments showed little change.

Course of Brokers' Loans.—By the end of November loans to brokers and dealers had been reduced by one-half, as compared with the peak volume of such loans in October, and were approximately at the same level as two years earlier. The greater portion of this decrease (about 60 per cent) was in loans of non-banking lenders. Changes in the volume of different classes of brokers' loans from Jan., 1926, to Oct. 23, 1929, and the subsequent decline in the five week period to Nov. 27, are summarized in the table on page 337.

Loan Reduction.—Brokers' loans, which had increased from Jan. 6, 1926 to Oct. 23, 1929, by $3,500,000,000 decreased in the five weeks from Oct. 23 to Nov. 27, 1929, by $3,200,000,000, giving a net increase for the entire period of only about $300,000,000. On October 23 New York banks were lending $260,000,000 less to brokers than in January, 1926, and in the five weeks following they reduced such loans further by $250,000,000. Out-of-town banks were lending to brokers $500,000,000 more at the peak in October than in January, 1926, but decreased these loans by

BROKERS' LOANS PLACED BY REPORTING MEMBER BANKS IN NEW YORK CITY

(In Millions of Dollars)

	Jan. 6, 1926	Oct. 23, 1929	Nov. 27, 1929	Changes		
				Jan. 6, 1929, to Oct. 23, 1929	Oct. 23, 1929, to Nov. 27, 1929	Jan. 6, 1926, to Nov. 27, 1929
Total loans to brokers ...	3,141	6,634	3,450	+ 3,493	− 3,184	+ 309
For banks, total	2,577	2,810	1,469	+ 233	− 1,341	− 1,108
For own account	1,338	1,077	831	− 261	− 246	− 507
For out-of-town banks [1]	1,239	1,733	638	+ 494	− 1,095	− 601
For others	564	3,823	1,982	+ 3,259	− 1,841	+ 1,418

[1] Includes an indeterminate amount for customers of these banks.

$1,100,000,000 in the weeks following. Loans by New York City and out-of-town member banks combined were in the aggregate on Oct. 23, $230,000,000 above the amount of such loans in January, 1926, and were reduced by Nov. 27 $1,100,000,000 below that level. Loans by non-banking lenders had increased by $3,260,000,000 between Jan. 6, 1926 and Oct. 23, 1929 and decreased by $1,840,000,000 in the following five weeks, showing after the decline an increase of $1,420,000,000 over the whole period of reporting.

Credit Improvement.—Too little time has elapsed as yet since the end of October to make possible a comprehensive appraisal of the effects of the drop in security prices on the banking situation. The diminution in the demand for credit from the security market has resulted in a decline of money rates. Although there has been an increase in the volume of bank credit, as the banks have taken over loans of non-banking lenders, the total volume of funds used in the security market has decreased by a large amount, and the general credit situation has been improved by the liquidation of these security loans.

New Capital Issues.—While the increase in security values has in recent years been a dominating factor in determining the course of brokers' loans, the trend of such loans has been affected also by the flotation of new capital issues, and the use of bank credit by issuing houses during the period of distribution to investors. Purchases of the new securities are made in part on credit extended through brokerage houses, which obtain funds for extending this credit by increasing their borrowings at the banks. The volume of domestic corporate issues each year from 1924 to 1929 is shown in the following table. During the first ten months of 1929 such issues were in nearly double the volume of the corresponding period of

CORPORATE DOMESTIC CAPITAL ISSUES

(In Millions of Dollars)

	Total	Railroads	Public Utilities	Industrial and Manufacturing	Land, Buildings, etc.	Miscellaneous
Year						
1924	3,322	780	1,326	691	333	193
1925	4,101	380	1,496	1,098	715	411
1926	4,357	346	1,604	1,197	709	500
1927	5,376	506	2,077	1,281	630	883
1928	6,015	364	1,883	1,474	716	1,577
Ten Months						
January to October, 1928	4,381	227	1,571	962	600	1,021
January to October, 1929	8,130	431	1,838	1,974	491	3,396

1928, representing a general growth in financing by manufacturing, mining, railroad and public utility corporations, and some decline in the financing of land and buildings. The large increase shown under the heading "miscellaneous," covers increase in capital stock issues of investment trusts. These issues were a large factor in the growth of loans to brokers on account of non-banking lenders in the later months of 1929, since some portion of the funds obtained by these trusts through the sale of their own capital issues was loaned out temporarily on call in the securities market and withdrawn from the call loan market following the drop in security values, to be utilized in the purchase of securities at these lower values.

CHANGES IN FEDERAL RESERVE MEMBERSHIP

During the year ended June 29, 1929, 105 banks joined the Federal Reserve System and 136 withdrew from membership, including banks that withdrew as a result of absorption of member by non-member banks. Mergers between member banks, suspensions and liquidations resulted in a net loss of 191 banks, so that total membership in the system showed a decline of 222 for the year. At the end of June, 1929 membership in the system embraced 8,707 banks—approximately one-third of all banks in the country—with total loans and investments of $35,711,000,000, or over 60 per cent of loans and investments of all banks. At the end of June, 1929, membership in the system included 7,530 National banks with loans and investments of $21,457,000,000; and 1,177 state banks with loans and investments of $14,254,000,000. While the number of member banks decreased during the year, total loans and investments of member banks increased by $650,000,000, this increase covering a decrease of $606,000,000 in loans and investments of National banks, and an increase of $1,256,000,000 for state member banks. During the past year, as in other recent years, while the number of member banks has declined somewhat, the resources of these banks have continued to increase.

PRINCIPAL RESOURCES AND LIABILITIES OF THE TWELVE FEDERAL RESERVE BANKS COMBINED

(In Millions of Dollars)

	Nov. 28, 1928	Nov. 27, 1929	Change
Resources			
Total gold reserves..	2,600	2,987	+ 387
Bills discounted ...	990	912	— 78
Bills bought in open market	482	257	— 225
U. S. Government securities	229	326	+ 97
Total bills and securities	1,706	1,514	— 192
Liabilities			
Federal Reserve Notes in actual circulation	1,766	1,930	+ 164
Deposits:			
Member bank reserve account ..	2,361	2,376	+ 15
Government	24	36	+ 12
Foreign bank	6	5	— 1
Other deposits ...	20	21	+ 1
Total deposits..	2,411	2,437	+ 26
Capital paid in	146	168	+ 22
Surplus	233	254	+ 21
Ratio of total reserves to deposits and Federal Reserve Note liabilities combined	65.2%	71.8%	

PRINCIPAL ASSETS AND LIABILITIES OF REPORTING MEMBER BANKS

(In Millions of Dollars)

	Nov. 28, 1928	Nov. 27, 1929	Change
Loans and investments. Total ...	22,094	23,353	+1,259
Loans on securities	7,246	7,889	+ 643
All other loans and discounts	8,954	9,809	+ 855
Investments	5,894	5,655	— 239
Net demand deposits	13,408	13,890	+ 482
Time deposits	6,846	6,760	— 86
Borrowings from Federal Reserve Banks	762	603	— 159

PERSONNEL

Governors.—George L. Harrison was appointed Governor of the Federal Reserve Bank of New York Nov. 23, 1928, to succeed the late Governor Strong. D. C. Biggs resigned as Governor of the Federal Reserve Bank of St. Louis, effective Dec. 31, 1928, and

CENTRAL GOLD HOLDINGS

(June 30, 1929. In Millions of Dollars)

Country	1924	1925	1926	1927	1928	1929	Increase (+) or decrease (—) between 1928-1929
United States[1]	4,095	3,962	4,056	4,202	3,732	3,956	+ 224
France	710	711	711	875[2]	1,136	1,436	+ 299
Great Britain	624	765	731	740	838	780	— 59
Argentina	458	461	451	452	622	527	— 95
Japan	599	586	570	544	541	542	+ 1
Spain	489	490	490	501	503	494	— 9
Germany	110	253	355	429	496	455	— 41
Italy	218	219	219	225	259	271	+ 12
Netherlands	214	183	172	162	175	176	+ 1
Other countries	1,146	1,226	1,226	1,287	1,444	1,490	+ 45
Total	8,663	8,856	8,981	9,415	9,748	10,126	+ 378

[1] Treasury and Federal Reserve Banks.

[2] Partly estimated.

MONETARY GOLD STOCK OF THE UNITED STATES

(In Millions of Dollars)

End of Month	1923	1924	1925	1926	1927	1928	1929
January	3,953	4,289	4,423	4,412	4,564	4,373	4,127
February	3,963	4,323	4,369	4,423	4,586	4,362	4,153
March	3,970	4,364	4,346	4,442	4,597	4,305	4,188
April	3,982	4,411	4,350	4,438	4,610	4,266	4,260
May	4,028	4,455	4,361	4,433	4,608	4,160	4,301
June	4,050	4,488	4,365	4,447	4,587	4,109	4,324
July	4,079	4,511	4,370	4,471	4,580	4,113	4,341
August	4,111	4,521	4,383	4,473	4,588	4,123	4,360
September	4,136	4,511	4,382	4,466	4,571	4,125	4,372
October	4,167	4,509	4,407	4,473	4,541	4,142	4,386
November	4,207	4,527	4,397	4,477	4,451	4,128	....
December	4,244	4,499	4,399	4,492	4,379	4,141	....

William McC. Martin, formerly Federal Reserve Agent at St. Louis was elected Governor of the Bank to succeed Mr. Biggs, effective Jan. 16, 1929. Rolla Wells was designated chairman of the board and Federal Reserve Agent to succeed Mr. Martin.

Advisory Council Members.—The following changes occurred in the membership of the Federal Advisory Council: William C. Potter appointed to represent the New York district to succeed James S. Alexander; John Poole to represent the Richmond district to succeed John F. Bruton; and J. P. Butler, Jr., to represent the Atlanta district to succeed P. D. Houston.

BANKS AND TRUST COMPANIES

By Gurden Edwards

Secretary, Economic Policy Commission, American Bankers Association

NATIONAL BANKS

Aggregate resources of all National banks in the United States dropped between June 30, 1928, and June 30, 1929, from $28,510,000,000 to $27,440,000,000 or by $1,070,000,000, which was 3.75%, while their numbers decreased from 7,691 to 7,536, which was a loss of 155 or only 2%. The year before, ending June 30, 1928, the aggregate resources of the National banks showed an increase of $1,926,000,000. Tables follow showing status of banks.

RESOURCES AND LIABILITIES OF NATIONAL BANKS

June 30, 1929, Compared with June 30, 1928

(In thousands of dollars)

	June 30, 1929	*June 30, 1928*
Number of banks	7,536	7,691
Resources		
Loans and discounts (including rediscounts)	$14,801,130	$15,144,995
Overdrafts	10,193	10,138
Investments	6,656,535	7,147,448
Banking house, furniture and fixtures	747,684	721,229
Real estate owned other than banking house	118,839	125,680
Cash in vault	298,003	315,113
Reserve with Federal reserve banks or other reserve agents	1,344,951	1,453,383
Other amounts due from banks	1,854,187	1,885,967
Exchanges for clearinghouse and other cash items	785,006	963,332
Other resources	823,700	740,954
Total resources	$27,440,228	$28,508,239
Liabilities		
Capital stock paid in	$ 1,627,375	$ 1,593,856
Surplus	1,479,052	1,419,695
Undivided profits—net	487,504	557,437
Reserves for dividends, contingencies, etc.	80,832	
Reserves for interest, taxes, and other expenses accrued and unpaid	73,968	83,753
National-bank circulation	649,452	649,095
Due to banks	2,175,932	2,738,017
Certified and cashiers' checks and cash letters of credit and travelers' checks outstanding	372,550	414,971
Demand deposits	10,504,268	11,003,795
Time deposits (including postal savings)	8,317,095	8,296,638
United States deposits	228,243	185,916
Total deposits	21,598,088	22,639,337
Bills payable and rediscounts	714,507	801,185
Agreements to repurchase securities sold	49,660	763,881
Acceptances executed for customers	392,623	
Other liabilities	287,167	
Total liabilities	$27,440,228	$28,508,239

Assets and Liabilities.—These data show decreases of $343,900,000 in loans and discounts and $490,900,000 in investments on the asset side, and of $562,100,000 in inter-bank deposits and $499,500,000 in demand deposits on the liability side.

Branch banking increased in the national bank system during the year; October 31, 1928, there were 992 branches officially reported, while on October 31, 1929, there were 1,061, an increase of 69.

Trust Banking.—The rapid growth of trust banking in the United States among other than trust companies was evidenced by the facts that 2442 National banks held authority to exercise trust powers in 1929 and that 1734 were exercising these powers through established trust departments, administering 75,988 trusts, with individual trust assets of $4,238,000,000. These figures represent an increase in three years of 630 National banks operating trust departments, with an advance of over 190% in the number of trusts being administered and of 359% in individual trust assets.

Dividends.—The National banks declared dividends during the year ended June 30, 1929, of $222,700,000, their gross earnings amounted to $1,424,500,000; net earnings, $437,600,000 and net additions to profits, $301,800,000.

Research.—The National Bank Division of the American Bankers Association, the nation-wide voluntary association of this type of bank, was effective during the year in saving the circulation privilege to the National Banks.

It also conducted comprehensive research in banking technique especially applicable to this class of banks and distributed the results among them.

STATE COMMERCIAL BANKS

Assets.—State Commercial Banks, 14,437 in number, reported aggregate assets on June 30, 1929, at $16,824,000,000, an increase of $533,300,000, whereas the total number of these banks fell off by 641. Detailed figures for the mid-year condition of this class of banks follow:

RESOURCES AND LIABILITIES OF STATE (COMMERCIAL) BANKS

June 30, 1929, Compared with June 30, 1928

(In thousands of dollars)

	June 30, 1929	*June 30, 1928*
Number of banks	14,437	15,078
Resources		
Loans and discounts (including rediscounts)	$10,361,723	$ 9,450,337
Overdrafts	38,016	34,535
Investments	3,084,672	3,542,177
Banking house, furniture and fixtures	464,469	458,961
Real estate owned other than banking house	152,629	145,434
Cash in vault	313,997	367,270
Reserve with Federal reserve banks or other reserve agents	866,173	802,255
Other amounts due from banks	903,315	908,578
Exchanges for clearinghouse and other cash items	298,859	215,437
Other resources	340,462	366,019
Total resources	$16,824,315	$16,291,003
Liabilities		
Capital stock paid in	$ 1,155,878	$ 1,051,182
Surplus	804,400	737,475
Undivided profits—net	237,422	
Reserves for dividends, contingencies, etc.	56,054	285,926
Reserves for interest, taxes, and other expenses accrued and unpaid	41,554	
Due to banks	649,980	513,947
Certified and cashiers' checks and cash letters of credit and travelers' checks outstanding	113,219	109,940
Demand deposits	6,515,263	6,130,757
Time deposits (including postal savings)	6,298,456	6,228,713
United States deposits	7,310	7,855
Deposits not classified	2,742	365,665
Total deposits	13,586,970	13,356,877
Bills payable and rediscounts	454,842	399,365
Agreements to repurchase securities sold	3,148	
Acceptances executed for customers	44,279	460,178
Other liabilities	439,768	
Total liabilities	$16,824,315	$16,291,003

These data show an increase of $911,400,000 in loans and discounts, a decrease of $457,500,000 in investments, and increases of nearly $221,000,000 in capital funds and of $384,500,000 in demand deposits.

Savings and Trust Activities.—As in the case of the National banks, there was a wide growth of savings and trust departmental activities among the state commercial banks. Growth of such departments in these institutions reflected the strengthening popular demand for complete banking services from a bank, including the handling of business and personal checking deposits, savings funds, investments and post-mortem financial management.

Improved Practices and Methods.—The State Bank Division of the American Bankers Association, the dominant National organization of commercial state chartered banks, comprising a majority of banks of this class, continued active during the year in promoting better banking practices and methods, better state bank supervision conditions, organization of city, county and regional clearing-house associations to foster a greater degree of coöperation for the common good among locally competing banks, and in a number of other directions aiming at improved banking both for the banks and the public.

TRUST COMPANIES

Number and Resources.—Trust companies in the United States on June 30, 1929, numbered 1,608, or 25 less than on the corresponding date of the year before, but they showed an increase in resources, which stood at $16,155,000,000 and were a growth of $924,000,000 in the year.

RESOURCES AND LIABILITIES OF LOAN AND TRUST COMPANIES

June 30, 1929, Compared with June 30, 1928

(In thousands of dollars)

	June 30, 1929	*June 30, 1928*
Number of banks	1,608	1,633
Resources		
Loans and discounts (including rediscounts)	$ 9,311,879	$ 8,298,341
Overdrafts	7,585	5,138
Investments	3,421,673	3,874,652
Banking house, furniture and fixtures	385,112	333,652
Real estate owned other than banking house	68,221	88,056
Cash in vault	156,580	151,571
Reserve with Federal reserve banks or other reserve agents	923,415	819,697
Other amounts due from banks	553,577	510,014
Exchanges for clearinghouse and other cash items	594,823	551,587
Other resources	732,310	598,188
Total resources	$16,155,175	$15,230,896
Liabilities		
Capital stock paid in	$ 941,333	$ 803,328
Surplus	1,454,504	1,085,968
Undivided profits—net	208,632	
Reserves for dividends, contingencies, etc.	9,958	
Reserves for interest, taxes, and other expenses accrued and unpaid	24,394	215,538
Due to banks	792,134	816,443
Certified and cashiers' checks and cash letters of credit and travelers' checks outstanding	350,881	338,886
Demand deposits	6,956,032	6,903,857
Time deposits (including postal savings)	3,989,532	3,957,869
United States deposits	44,134	28,702
Deposits not classified	13,985	12,777
Total deposits	12,146,698	12,058,534
Bills payable and rediscounts	437,992	349,926
Agreements to repurchase securities sold	2,669	
Acceptances executed for customers	12,942	717,602
Other liabilities	916,053	
Total liabilities	$16,155,175	$15,230,896

These figures show that the trust companies increased their loans and discounts by $1,014,000,000 during the year indicated, while their investments fell off by $453,000,000. Their capital funds expanded by $534,000,000, while all classes of deposits virtually stood still.

Activities of Trust Company Division, A. B. A.—The chief National unifying factor among the trust companies is the Trust Company Division, American Bankers Association, and this organization reached its thirty-third year of activity in 1929. When it was organized there were only 242 trust companies with resources of but $807,000,000. The division represents the trust companies in a National way in many capacities, such as in respect to both Federal and state legislation affecting their business and that of their clients and in regard to taxation bearing on banking resources, estates, trusted funds and other property entrusted to their care. During the year the Trust Company Division held four regional conferences on trust matters, technique and administration, at which more than

50% of the trust officers of the country were represented. The efforts of the organization against double taxation on securities of non-resident decedents has resulted in 36 states creating reciprocal exemptions, 14 having been added in the year.

SAVINGS BANKS

Stock Savings Banks.—There were 1,358 savings banking institutions in the United States in 1929, a decrease of 49. Of these savings institutions, 747 were stock savings banks with total resources of $1,590,000,000 and with capital surplus and undivided profits of $119,256,000 on June 30, 1929. These figures represent a loss in numbers of 44 for this class of bank, with a decrease of $117,352,000 in point of total resources and $9,193,000 in capital funds as compared with the corresponding date for 1928. These reductions were in line with the trend of recent years in this class of banking institutions which are suffering from the competition of other classes of banks now conducting savings activities and departments and attracting deposits. Deposits declined in the stock savings banks in the year by $109,000,000.

RESOURCES AND LIABILITIES OF STOCK SAVINGS BANKS

June 30, 1929, Compared with June 30, 1928

(In thousands of dollars)

	June 30, 1929	*June 30, 1928*
Number of banks	747	791
Resources		
Loans and discounts (including rediscounts)	$1,006,325	$1,049,969
Overdrafts	230	207
Investments	382,262	427,987
Banking house, furniture and fixtures	43,502	45,791
Real estate owned other than banking house	21,270	23,335
Cash in vault	17,345	19,912
Reserve with Federal reserve banks or other reserve agents	16,888	27,917
Other amounts due from banks	93,960	87,864
Exchanges for clearinghouse and other cash items	6,060	20,149
Other resources	2,003	4,066
Total resources	$1,589,845	$1,707,197
Liabilities		
Capital stock paid in	$ 62,487	$ 68,878
Surplus	40,513	42,472
Undivided profits—net	13,624	17,099
Reserves for dividends, contingencies, etc.	1,062	
Reserves for interest, taxes, and other expenses accrued and unpaid	1,570	
Due to banks	8,107	10,995
Certified and cashiers' checks and cash letters of credit and travelers' checks outstanding	372	461
Demand deposits	219,770	215,206
Time deposits (including postal savings)	1,230,228	1,345,996
United States deposits	5,381	343
Deposits not classified	165	16
Total deposits	1,464,023	1,573,017
Bills payable and rediscounts	5,336	3,141
Agreements to repurchase securities sold	....	2,590
Acceptances executed for customer	54	
Other liabilities	1,176	
Total liabilities	$1,589,845	$1,707,197

Mutual savings banks fared better during the year. There were 611 institutions of this class on June 30, 1929, with aggregate resources of $10,006,000,000. These figures represented a loss as to numbers of only 5 in the year and an increase in resources of $318,293,000. The capital funds in this class of bank, comprised in the items surplus, undivided profits and reserves, stood at $986,174,000, a decrease of $14,000,000. A rise in deposits was recorded, this item standing on the 1929 date at $9,003,000,000, a gain in the year of three hundred and thirty million dollars.

RESOURCES AND LIABILITIES OF MUTUAL SAVINGS BANKS

June 30, 1929, Compared with June 30, 1928

(In thousands of dollars)

	June 30, 1929	*June 30, 1928*
Number of banks	611	616
Resources		
Loans and discounts (including rediscounts)	$ 5,801,489	$ 5,511,918
Investments	3,775,770	3,750,591
Banking house, furniture and fixtures	110,269	100,716
Real estate owned other than banking house	23,059	14,600
Cash in vault	31,495	31,162
Reserve with Federal reserve banks or other reserve agents	35,986	
Other amounts due from banks	150,137	210,698
Exchanges for clearing house and other cash items	5,946	1,726
Other resources	72,301	66,748
Total resources	$10,006,452	$ 9,688,159
Liabilities		
Surplus	$ 823,693	$ 851,590
Undivided profits—net	147,725	148,586
Reserves for dividends, contingencies, etc.	13,527	
Reserves for interest, taxes, and other expenses accrued and unpaid	1,229	
Due to banks	182	204
Certified and cashiers' checks and cash letters of credit and travelers' checks outstanding	46	174
Demand deposits	98,473	6,962
Time deposits	8,903,126	8,665,803
Deposits not classified	1,519	58
Total deposits	9,003,346	8,673,201
Bills payable and rediscounts	1,366	540
Agreements to repurchase securities sold	....	14,242
Acceptances executed for customers	....	
Other liabilities	15,566	
Total liabilities	$10,006,452	$ 9,688,159

Savings Deposits.—While the foregoing figures cover the specifically designated savings banking institutions, savings banking activities, however, in the United States are not wholly comprised within such institutions. To find the full facts regarding savings deposits in banks it is necessary to go to the figures for all classes of banks as has been done by the Savings Bank Division of the American Bankers Association. The figures compiled by the association show that total savings in banks in the United States on June 30, 1929, aggregated $28,218,000,000, a decrease of $195,000,000 since the corresponding date of a year earlier and the first drop in these figures recorded in the 20 years these figures have been annually compiled. The following tables give a statistical picture of the savings banking situation in the United States in 1929 as compared with the situation in the immediately preceding years.

SAVINGS DEPOSITS IN CLASSIFIED BANKS

(In thousands of dollars)

Year	*Mutual Savings Bks.*	*State Banks*	*Trust Companies*	*Private Banks*	*National Banks*
1927	$8,039,784	$7,382,147	$3,530,954	$49,725	$7,088,297
1928	8,668,090	7,597,977	4,080,324	16,797	8,049,773
1929	8,903,557	7,412,561	4,022,735	33,285	7,889,352

TOTAL DEPOSITS AND DEPOSITORS IN ALL BANKS

Year	*Total Savings Deposits*	*Total Number Savings Depositors*	*U. S. Per Capita Savings Deposits*
1927	$26,090,902,000	48,354,784	$220
1928	28,412,961,000	53,188,348	237
1929	28,217,656,000	52,815,903	235

School Savings.—Another important phase of savings is school savings banking, developed under the leadership of the American Bankers Association's Savings Bank Division on a plan by which education in thrift is carried on along with school hours on a wide scale throughout the country. The following data show the facts in this plan:

SCHOOL SAVINGS IN THE UNITED STATES

Year	*Number of Schools*	*Number Participating*	*Deposits*	*Net Savings*
1926-27	12,678	3,742,551	$23,703,436	$ 9,464,178
1927-28	13,835	3,980,237	26,005,138	9,476,391
1928-29	15,597	4,222,935	28,672,496	10,539,928

PRIVATE BANKS

Number and Resources.—The private banks reporting to the public banking authorities in the United States during 1929 numbered 391 institutions, a drop of 13 units in this class. The total resources showed an increase, amounting on June 30, 1929, to $156,490,000, a rise of $7,656,000 in a year. The private banks' total capital funds at $22,031,000 showed an increase of $3,649,000. Their total deposits were slightly reduced, being $111,516,000, which was $645,000 below the figure for the year previous.

RESOURCES AND LIABILITIES OF ALL REPORTING BANKS IN THE UNITED STATES AND POSSESSIONS

June 30, 1929, Compared with June 30, 1928

(In thousands of dollars)

	June 30, 1929	*June 30, 1928*	*Increase*	*Decrease*
Number of banks	25,330	26,213	....	883
Resources				
Loans and discounts (including rediscounts)	$41,376,269	$39,542,067	$1,834,202	....
Overdrafts	56,847	50,407	6,450	....
Investments	17,348,738	18,771,814	....	$1,423,076
Banking house, furniture and fixtures	1,754,454	1,663,696	90,758	....
Real estate owned other than banking house	390,816	403,967	....	13,151
Cash in vault	819,928	887,845	....	67,917
Reserve with Federal reserve banks or other reserve agents	3,567,525	3,616,408	....	48,883
Other amounts due from banks	1,691,772	1,753,098	....	61,326
Exchanges for clearinghouse and other cash items	1,973,946	1,779,186	194,760	....
Other resources	3,192,200	3,105,840	86,360	....
Total resources	$72,172,505	$71,574,328	$ 598,177	....
Liabilities				
Capital stock paid in	$ 3,796,978	$ 3,525,522	$ 271,456	....
Surplus	4,611,698	4,145,529	466,169	....
Undivided profits—net	1,097,386	1,310,114	91,531	....
Reserves for dividends, contingencies, etc.	161,483			
Reserves for interest, taxes, and other expenses accrued and unpaid	142,776			
National bank circulation	649,452	649,095	357	....
Due to banks	3,629,197	4,081,028	....	$ 451,831
Certified and cashiers' checks and cash letters of credit and travelers' checks outstanding	837,430	864,585	....	27,155
Demand deposits	24,350,164	24,306,651	43,513	....
Time deposits (including postal savings)	28,787,617	28,538,109	249,508	....
United States deposits	286,112	222,816	63,296	....
Deposits not classified	20,121	399,938	....	379,817
Total deposits	57,910,641	58,413,127	....	502,486
Bills payable and rediscounts	1,630,703	1,566,146	64,557	....
Agreements to repurchase securities sold	55,523	1,964,795	206,593	....
Acceptances executed for customers	449,917			
Other liabilities	1,665,948			
Total liabilities	$72,172,505	$71,574,328	$ 598,177	....

FOREIGN EXCHANGE

BY FRED I. KENT

DIRECTOR, BANKERS TRUST COMPANY

CHANGES IN MARKET CONDITIONS

Through the earlier post-war years foreign exchange commanded the interest in financial communities of a large following, frequently rivaling the security market as a channel for speculation. In recent years, however, most of the European nations and many other countries have returned to the gold standard or otherwise provided for a basis of currency stabilization. The result has been to remove the foreign exchanges from the arena of active trading in a speculative sense, and rates are now mainly restricted to such fluctuation as the movement of funds against normal commercial requirements entails. The foreign currency market, therefore, may be said to attract only a relatively small coterie of dealers and students of economics. For those in this coterie, the year 1929 has been fraught with many possibilities and has provided an opportunity for study of the difficulties which beset the gold standard and its operations under the stress of current conditions.

EXCHANGE RATES AND RATE FACTORS

Price Trends.—The prices at which the various exchanges sold during the year are of less importance than the combination of factors that influenced them. Practically all the Continental currencies were at their low levels or moved toward still lower levels in the first half of the year. This was attributable for the most part to the high rates obtaining in New York for short term loans. High money rates, of course, were caused by the unprecedented and continued rise in stocks, a movement in itself which drew large sums of money from all parts of the world as the mania spread for participating in the "easy money" opportunity America seemed to offer.

The Pound Sterling.—The continued draining of money from Great Britain depressed the pound sterling to approximately $4.84 13/16 early in February at which time gold was shipped to New York. As a protective measure, the Bank of England which had maintained its rediscount rate at 4½ per cent for two years, advanced the rate to 5½ per cent, the immediate effect of which was a sharp rally in sterling to $4.85 13/16. The effect was temporary, however, and funds still flowed to New York for investment, the exchange rate reacting over a period of months. In August and the first half of September the sterling rate dropped back approximately to $4.84 11/16, and it seemed probable that gold would again flow to America, but events were shaping to change the situation. The failure of the so-called Hatry group in London in September had a benumbing effect on the London Stock Exchange. While not causing any immediate concern in New York it tended to inspire caution in informed circles. At the same time there were indications that the New York stock market had been overbought, and a general feeling of nervousness prevailed. The Bank of England advanced its discount rate to 6½ per cent Sept. 26, and this step was believed by many to have been partly instrumental in toppling over the inverted pyramid of share prices. The crash made possible the return of vast sums to foreign institutions which had been taking advantage of high returns on this side, and caused at once a reversal of trend in all foreign currencies. Sterling recovered rapidly and by December was selling at $4.88⅜, substantial amounts of gold going to England. The Bank of England was thus enabled to reduce its discount rate to 6 per cent in October, to 5½ per cent in November, and 5 per cent in December.

The French Franc.—The franc rate moved in an orderly way from as low as $0.0390½ in March to $0.0394⅛ in November. France took large sums of gold both from England and the

United States. This gold will most likely be used to strengthen her position against the time when France must make arrangements for financing a large part of her internal debt, about a third of which matures within the next few years.

The Reichsmark was active, being quoted early in the year at $0.2380⅝ but displaying a tendency to weakness until the end of April when the rate broke sharply to as low as $0.2359. This was a reflection of the fear that a breakdown in the negotiations at Paris for a final settlement of the Reparations problem was imminent. This fear proved to be unfounded, and reichsmarks along with virtually all the Continental currencies advanced steadily, reaching a high point in December at about $0.2396.

Scandinavian Currencies. — The markets were orderly in their movements. Danish exchange declined from $0.2670 early in the year to $0.2661 in September, rallying in December to $0.2685. Norway experienced a similar movement as did Sweden, the former reacting to $0.2662 and recovering to $0.2683, the latter declining to $0.26695 and rallying to $0.2699.

Holland.—The guilder declined from $0.40175 in January to $0.40035 in February. By May 1st. it had recovered to $0.4022 but dropped back again in August to $0.40045. A forward movement set in, however, and the rate rose steadily to $0.4038 in December.

Spain.—Movements in the peseta were rather wild and erratic through the year although trading was thin. From $0.1634 in January, the course was downward and fluctuations violent. The low point at $0.13715 was reached in June. In October the rate had rallied to $0.1486 but in November had reacted to $0.1368.

Other Exchanges.—The Belgian belga eased off from $0.1391 in January to $0.138775 in June and advanced slowly to $0.14 early in December. The Swiss franc fluctuated between $0.1927 and $0.1923 until August when the trend turned upward, the rate reaching $0.1945 in December. The Greek drachma was virtually unchanged. In the Balkan and Succession States movements were scarcely more than nominal and business was quiet. During the fall Japan returned to the gold standard after obtaining a credit of £5,000,000 in London and of $25,000,000 in New York to be used for that purpose. Yen fluctuated rapidly through the year, recovering from a low at $0.4365 in June to $0.49 toward the close of the year.

CANADIAN EXCHANGE

Canadian dollars performed most spectacularly during the year and at times the fluctuations were reminiscent of the period immediately after the war. Early in the year some gold came to us from Canada, as Canadian funds were quoted approximately ¼ per cent discount, which figure is the normal gold point. Because of the rising stock market here speculation in stocks was rife and funds were sent down from Canada for investment in American securities. The call loan market also drew huge sums of money and consequently the pressure on Canadian Exchange was so great that if the rate was to be held at the gold point it would soon drain the Dominion's gold. It was, therefore, deemed expedient to permit the rate to seek its own level with the result that it declined to 1 per cent in March rallying temporarily to a quarter per cent early in August. From this point it dropped precipitately to 2 per cent by the end of September. The New York stock market was starting to slide and when the crash came the demand for margin against securities was so heavy that Canadian funds sent down to New York for the purpose depressed the rate to 3 per cent on October 30. The rebound from this rate was sharp and by the middle of December funds were quoted at ¾ per cent.

LIFE INSURANCE

By Wendell M. Strong

Associate Actuary, Mutual Life Insurance Company of New York

NEW INSURANCE

Increase.—Judging from the figures compiled for the first ten months of the year 1929, there will again be an increase in the total life insurance issued. The increase will apparently be confined to ordinary and industrial insurance, since over the period for which statistics are available there was a decrease in the amount of group insurance written. The group insurance shows an increase over 1927, the decrease from 1928 being evidently due to the fact that in the latter year two of the largest industrial corporations of the country insured their employees under group insurance contracts. The increase in the total insurance issued, while small, is gratifying. The following table complied from the records of forty-four United States companies, having 82% of the total business in force in the United States, gives the amount of new insurance written during the first ten months of 1929 by these companies as compared with the corresponding period in 1928:

	1929	1928	Percentage of increase over 1928
	(millions)	(millions)	
Ordinary Insurance	$ 7,256	$ 6,721	8
Industrial Insurance	2,415	2,244	7.6
Group Insurance	939	1,058	11.3 decrease
Total	$10,610	$10,023	4.3

INSURANCE IN FORCE AND ASSETS

Insurance in Force.—In August announcement was made that the amount of ordinary and industrial life insurance in force in the country was in excess of one hundred billion dollars. Even in a country so accustomed to enormous figures as the United States this is startling. It was not until 1922 that the amount of insurance in force reached the figure of fifty billion dollars, so that the second fifty billion dollars has been written in less than seven years, during which period there has been only a small percentage increase in population and no depreciation in the value of the dollar to require a greater amount of insurance for the same protection.

Assets.—Statistics compiled for the first nine months of the year from the records of forty United States companies, having 82% of the total admitted assets of all United States companies indicated that by December 31, 1929 the total assets of United States life insurance companies will be about seventeen and one-half billion. This indicates that during the same period that the companies have been doubling amounts of insurance in force, they also doubled their assets since the total assets at the end of 1922 were almost one-half of the probable assets at the end of 1929.

LIFE INSURANCE DIVIDENDS

Dividends for the year 1929 were generally increased and stood at what is probably the highest average rate for any year. No announcements of dividends for the year 1930 have as yet been made, but there have been no developments in the life insurance business to indicate that the dividends will not be at least as good as in 1929. The following table shows the dividends paid, the rate of interest earned by, as well as the insurance expenses of a large number of representative companies for the years 1923 to 1928 inclusive. One of the notable features of this table is the comparatively slight increase in the insurance expenses for 1928 over 1927, as compared with 1927 over 1926. The table also shows a great increase in the total amount of dividends as well as the practically stationary rate of interest.

DIVIDENDS, EXPENSES, AND INTEREST RATES

Year	Number of Companies	Dividends Paid	Number of Companies	Insurance Expenses	Year	Rate of Interest on Mean Invested Funds by 100 Life Insurance Cos.
		(millions)		(millions)		%
1928......	331	$466	196	$407	1928......	5.30
1927......	319	418	192	397	1927......	5.32
1926......	322	376	192	374	1926......	5.29
1925......	308	351	196	352	1925......	5.34
1924......	297	320	197	321	1924......	5.38
1923......	260	274	183	265	1923......	5.38

(See note 3 under table on page 351, "Surrenders, Loans and Dividends")

DISABILITY BENEFITS

Problems.—The great increase in the issuance of policies providing for disability benefits has involved troublesome problems. These policies, which are now written by nearly all the insurance companies in the United States, provide that in event of total and permanent disability the premium for the policy shall be waived and an income, usually $10.00 per month for $1,000 of the amount insured, shall be paid to the insured during the continuance of such disability.

Premium Rates.—When these benefits were first introduced several years ago premium rates were based on the experience of fraternal orders where the conditions were quite different from those met by life insurance companies. The premiums on the basis of these tables have, with the development of the disability feature, proved insufficient, and the Companies have lost money on this feature. The situation has for some time received the earnest consideration of company officials. In 1926 a committee of the Acturial Society of America compiled the experience of a number of companies, but because of the short period included in the experience the committee did not at that time recommend that the compilation be made the basis for new premium rates. During the year 1929, however, the experience of the Mutual Life Insurance Company of New York was published by Wendell M. Strong, and that of the New York Life by Arthur Hunter. The experience of each of these large companies confirms what is known as "Class 3" of the experience compiled by the committee of the Actuarial Society. As a result this latter has been used to construct a series of tables for disability premium rates, which will be much higher than those now charged by many companies. A number of companies expect to put these new premiums into force during the year 1930.

Disability Action of State Departments.—The problems which arose from the rapid development of the disability feature attracted the attention of the State Departments of the various states which acted in a way different from the companies. The companies devoted their attention to the united effort to obtain adequate premium rates. There was, however, a feeling throughout the various state insurance departments that an equally troublesome problem was given by the different disability provisions offered by the policies of different companies. Competition tended toward the inclusion in policy contracts of more extended benefits, so that disability benefits became an increasingly important part of the contract, and in the opinion of many went beyond the proper limit of an adjunct to a life insurance policy. In 1928 the National Convention of State Insurance Commissioners appointed a joint committee of state department actuaries and company actuaries to consider the question of standard provisions for disability benefits to be required in all policies providing for such benefits. The report of this committee was submitted to the National Convention in September, 1929 and the report was adopted. Various State Departments have since ruled that policies issued in the respective states beginning not later than July 1, 1930, must be in accord with the standard provisions recommended by the joint committee of actuaries. While these standard provisions do allow a considerable latitude they, nevertheless, limit the amount of benefits that may be provided for and also place other restrictions on the disability provisions.

There is no doubt but that the difficulties which led to the action by the Insurance Commissioners were substantial. There is a question, however, whether the wiser action would not have been to permit the companies themselves to solve the problems just as in the earlier days of life insurance the companies were allowed to solve the problems then encountered.

ACCIDENTAL DEATH BENEFITS

Most companies which issue policies providing for disability benefits also provide for an additional payment of the face amount of the policy in event of death from accident. The experience of the companies under this provision has been more favorable than under the disability provision, and there have been no particular difficulties met in connection with it. The following tables compiled from the reports of seven large companies reporting to the State of New York show the increase in the payments under the disability and accidental death by provisions for the years 1923 through 1928.

AMOUNTS PAID FOR ACCIDENTAL DEATH AND DISABILITY BENEFITS

(Seven Companies with largest amount in force reporting to New York State)

Year	Payment on Account of Total and Permanent Disability	Payment on Account of Accidental Death Benefits
	(millions)	(millions)
1928	$25	$8
1927	18	6
1926	15	5
1925	11	4
1924	7	4
1923	5	3

NEW YORK EXPENSE LIMITATION

In 1929 the New York State Legislature passed a bill recommended by the Superintendent of Insurance, revising the sections of the New York insurance law limiting expenses of the companies. The earlier law was adopted in 1906 and changes in the life insurance business during the twenty-two year period had rendered a revision of the law advisable. The most important feature of the change is that the new law is fairer than the old one to companies having low premium rates.

AVIATION HAZARD

Pilots.—Aviation risks continue to receive the consideration of the underwriting officials of life insurance companies. The aviation hazard divides itself into two parts, pilots and passengers. It is generally recognized that the hazard for pilots is very great and companies which accept pilots at all do so only at a high extra premium.

Passengers.—The real problem is that of passengers. Flying is increasing very rapidly and while undoubtedly planes are becoming safer and the risk per flight is decreasing, the difficulty for the companies is increasing. More people are flying as passengers and those who do fly are probably taking more flights per year. Thus far the general tendency is to accept without an extra premium those who probably will fly only a few times per year and as passengers on well established routes with competent pilots. Those who will fly more than a few times or in a way that is hazardous are either charged an extra premium or not accepted. One of the difficulties is that the statistics available are not at all satisfactory. This will undoubtedly continue for a long time for there is bound to be difficulty due to the fact that with anything changing as rapidly as aviation only the most recent statistics would be of any value.

FINANCIAL

Effect of Decline in Securities.—The financial disturbance in the principal security markets of the country in October and November did not affect the financial position of the life insurance companies. One reason for this is that companies' investments are almost entirely in gilt edge bonds and first mortgages, although with the recent legislation in New York State permitting investment in certain preferred stocks there has been some investment in this class of security. The principal effect of the sudden depreciation in stock prices which was felt by the companies was in a rapid increase in policy loans.

INDUSTRIAL INSURANCE

The only notable feature in connection with reports of industrial insurance is that the increase in new business for 1928 over the year before is not as great as previous increases. The total amount of insurance in force at the end of 1928 in sixty-five companies is over sixteen and one-half billion dollars, and if the same increase is shown during the present year there will be approximately eighteen billion dollars of industrial insurance in force on December 31, 1929.

FRATERNAL INSURANCE

There was no outstanding important event during the year in the field of fraternal insurance. The table of

INSURANCE BY UNITED STATES FRATERNAL ORDERS

(Insurance Year Book)
(in millions)

Year	Number of Orders	Assessments	Total Income	Claims Paid	Total Disbursements	Assets at end of year	New Business	No. certificates in force at end of year	Amount in force at end of year
1928	262	$197	$245	$140	$182	$824	$1,040	9	$9,324
1927	235	193	238	133	171	760	1,026	8	9,727
1926	249	182	224	121	159	660	1,033	9	9,835
1925	224	188	222	121	160	628	1,106	8	9,770
1924	228	186	216	116	153	566	1,097	13	9,806
1923	227	128	207	110	152	491	795	8	8,759

ORDINARY AND INDUSTRIAL INSURANCE

(Insurance Year Book)
(in millions)

Year	Number of companies	End of Year		Premiums Received	Total Income	Total Payments to Policyholders	Total Disbursements	New Business [2]	Amount in Force at End of Year [2]
		Admitted Assets	Surplus [1]						
1928	331	$15,961	$1,678	$3,146	$4,088	$1,699	$2,548	$18,674	$95,206
1927	319	14,392	1,537	2,874	3,673	1,500	2,295	17,135	87,022
1926	322	12,940	1,364	2,624	3,330	1,373	2,124	16,461	79,644
1925	308	11,538	1,234	2,384	3,018	1,243	1,936	15,473	71,690
1924	297	10,394	1,137	2,122	2,703	1,174	1,813	13,195	63,780
1923	291	9,455	1,078	1,900	2,427	1,088	1,693	12,070	56,804

Note: These tables are compiled for the 1929 edition of THE AMERICAN YEAR BOOK, in which the figures for certain years show unimportant differences from earlier editions.

[1] Includes amounts set apart for dividend to policy holders during following year.

[2] Includes Group Insurance.

SURRENDERS, LOANS, AND DIVIDENDS [1]

(in millions)

Year	Number of Companies	Amount in Force at End of Year [2]	Amount of Policies Surrendered [2]	Policy Loans at End of Year	Dividends to Policyholders	Amount Paid for Surrendered Policies
1928	48	$64,367	$1,134	$1,663	$440	$307
1927	48	58,649	1,072	1,484	394	268
1926	44	53,680	864	1,336	362	236
1925	41	47,481	748	1,212	329	207
1924	38	41,787	698	1,108	330 [3]	198
1923	38	37,545	639	1,033	284 [3]	192

[1] Only life companies reporting in New York State.

[2] Includes Group Insurance but not Industrial.

[3] Includes dividend funds on foreign business transacted by one large company. This accounts for the apparent discrepancy in figures for corresponding years in the earlier table "Dividends, Expenses, and Interest Rate" where these dividend funds were not included.

statistics concerning fraternal insurance does show a rather marked decrease in the amount in force at the end of the year.

INDUSTRIAL INSURANCE IN UNITED STATES INDUSTRIAL COMPANIES

(Insurance Year Book)
(in millions)

Year	Number of Companies	New Business	Insurance in Force at End of Year		Premiums Received	Losses Paid
			Number of Policies	Amount		
1928	65	$4,505	86	$16,686	$1,289	$259
1927	58	4,465	82	15,448	1,137	219
1926	49	3,954	76	14,035	1,040	203
1925	60	3,656	74	12,824	941	176
1924	54	3,011	68	11,344	818	153
1923	49	2,015	63	10,107	712	142

DEATH OF HALEY FISKE

The American insurance world suffered a severe loss in the death of Haley Fiske, president of the Metropolitan Life Insurance Company. Mr. Fiske had been for many years an outstanding figure in life insurance both because he was president of the largest life insurance company in the world, and because of his own great force and ability. Mr. Fiske has done a great deal for the insurance business.

FIRE INSURANCE

BY EDWARD R. HARDY

SECRETARY-TREASURER, INSURANCE INSTITUTE OF AMERICA

PREMIUM VOLUME

So far as volume of business is concerned, fire insurance has had a fairly normal year. It is possible that unless there is a definite change in values the volume of premiums now reached may represent a maximum. The growth of the country, which steadily continues, calls for more fire insurance to protect property. This, however, is offset by two factors, which cause premiums to remain more or less stationary, while the values to be insured increase. The first factor is the high percentage of construction which is fireproof and carries a low rate of insurance; the second factor is the now well-established practice of installing sprinklers in all properties of mercantile or manufacturing occupancy, invariably where the values are of any amount. This means, as in the case of fireproof construction, that increased values are being protected, but the rate of insurance is low, and hence the premium is small. The underwriter, however, is glad to see both of these factors playing a steady part in the erection of new structures.

COMPANY ASSETS, LIABILITIES AND INCOME

It should be remembered that the fire insurance companies do a marine business, as well as a business in many other side-lines which play an important part in their income. The statistics will develop this. The total assets of this body of companies is now approximately $2,500,000,000; the liabilities $1,200,000,000; and the income $1,250,000,000. Of this income the fire premiums are yielding about $750,000,000 and other premiums $250,000,000, the balance coming from other sources, investments, etc. The fire loss is approximately $350,000,000; the other loss is $130,000,000. The face value of outstanding fire insurance policies runs to $175,000,000,000, while the face values of the policies outstanding for other risks is

$50,000,000,000. The latest estimate of the wealth of the United States is put at $320,000,000,000. It will be seen, therefore, that fire insurance policies cover more than half the estimated wealth of the country. That probably represents the amount of wealth of the country which may be considered as burnable, fire insurance having reached that point where practically all risks are protected by insurance against loss by fire. The average rate of insurance throughout the United States is about .80. This has shown a tendency to decrease, and this decrease is to some extent, at least, accounted for by the increase in fireproof construction and sprinklered properties.

The changing stock market conditions will affect, as in all corporations, the paper value, so to speak, of the assets, but so far as the insurance companies are concerned they are by and large conservatively managed, as their investments are on an extremely sound basis.

CONSOLIDATION TREND IN COMPANY ORGANIZATION

One outstanding feature which should be noted is the tendency in the past two years regarding the formation of new companies. Inasmuch as there was no large increase in fire insurance premiums, many doubted the wisdom of forming new companies. It seemed to be possible, however, to secure capital for this purpose, and the work went forward. That has now been checked, and probably no new companies will be organized unless they are closely allied with already existing companies, and there is not much possibility of that at the present time. The tendency to consolidate, or bring under one management several companies, has been manifest during the year. This probably represents an economic condition, as in other lines of business, which it is difficult, if not impossible, to avoid. It should be understood that when one company today takes another company over, the company taken over does not pass out of existence, but is continued as a separate organization. There are distinct advantages in this from the business standpoint. Whether this measure be for good or bad, the tendency is for large groups to grow, and for the individual, small company to disappear.

SPECIAL RATE PROBLEMS

Special rate problems in two states have not yet been brought to a satisfactory conclusion. In one case the Supreme Court of the United States has permitted a re-argument, and that may be reached during the year. This case went to the Supreme Court because the companies declined to grant a reduction ordered by the Superintendent of Insurance. The claim of the companies was that the business had not shown a profit. The Supreme Court denied their request, and pointed out that with the reduced rates which were ordered by the Superintendent some companies would have made a profit. This left those companies that had not made a profit in a somewhat different position. One such company is now taking up the case for re-argument. Even if the decision is won it will probably be of doubtful validity to the companies, since it is obvious that there cannot be two rates for the same property; if one company is willing to write at a lower rate, all the business will be written at that rate.

MARINE INSURANCE

By Douglas F. Cox

Appleton & Cox, New York

UNDERWRITING SCOPE AND RESULTS

Companies and Transactions.—In attempting to review, at this time, the year 1929 in the marine insurance business from the point of view of volume, results, etc., the usual obstacle is encountered in the fact that the figures showing the transactions of the Companies will not be published until several months of 1930 have passed. The published figures showing the transactions of 1928 indicate that the Companies doing Ocean Marine only were six in number, which is the same as in 1927, those doing both Ocean and Inland numbered ninety-four, being an increase of ten over 1927, while there were sixty Companies doing Inland only, an increase of eighteen. The total number of Companies interested in the business in 1928 was therefore 160, an increase of 28 as compared with the number so interested in 1927.

Volume of premiums written also increased considerably in the aggregate, the total figures for 1928 being $46,419,000 Ocean and $46,962,000. Inland, an increase of $4,886,000 in the former class and $7,274,000 in the latter.

Earning Ratios.—As to results, it is impossible to speak accurately because the published figures show only the ratio of losses paid during the year to premiums written during the year, whereas, to be accurate we should compare premiums earned with losses incurred. However, the available figures indicate a better result than the similar figures of 1927, the ratio for the Ocean business being just under 60%, which is just on the border-line between profit and loss, dependent upon whether the expense ratio, which includes commissions and all other costs, of any particular company is under or over 40%. In this respect again it is impossible to be accurate, as the published figures do not show the expense ratio on marine separately but only the ratio on the entire business of a company which in most cases is predominantly fire insurance. The published ratio is usually more than 40%, but the expense on Ocean Marine business is generally less than on fire business. Altogether, it would appear that while some companies probably made some profit on their Ocean business, the majority made little or nothing. In the Inland class, the results in 1928 appear to be considerably better, both as compared to the Ocean in the same year and to the Inland in 1927.

Losses and Rates.—There has been a continuation of heavy losses in Ocean business during 1929 and it does not seem likely that there will be much, if any, profit in that division of the business. On the Great Lakes also, there have been numerous total losses both on hulls and cargoes. Reports from the Foreign Market indicate that while better rates are being obtained on hulls, the cargo business has not yet recovered from the post-war demoralization.

DISTINCTION BETWEEN "OCEAN" AND "INLAND" BUSINESS

The definition of marine insurance in the insurance laws is necessarily broad. It includes not only insurances upon vessels and craft of all kinds, but upon merchandise and movable property of all kinds provided the subject of the insurance is in transit or moving from place to place during a substantial part of time covered by the policy. The movement need not be at all by water, it may be entirely by land or by air, but the two general divisions have been adopted for convenience by the State Insurance Departments in connection with the Annual statements made by the Companies. The term "Inland Marine" therefore includes a great variety of policies ranging all the way from insurances upon the hulls of Sound and River Steamers to insurance upon personal jewelry in the possession of its owner.

DIFFICULTIES WITH FIRE AND CASUALTY COMPANIES

Policy Coverage.—As all marine policies cover the risks of fire and theft in addition to the "perils of the seas," it is easy to see that as merchandise in the course of movement from place to place comes to rest for a time, it is covered under the marine policy against risks which would otherwise have to be protected by fire insurance and burglary insurance. For instance, cotton is covered under the marine policy from the time it leaves the plantation until it is delivered say in the interior of Europe, first by rail to a "concentration point" where it is compressed, then perhaps by rail again to the steamer which takes it to a European sea-port and again by rail.

Position of Fire and Casualty Companies.—Marine policies containing similar features are issued in great variety in various trades and are a great convenience to the public; in fact, they are in many cases indispensable. This method of insuring, however, has been developed to such an extent that fire and casualty companies complain that they are thereby deprived of business which legitimately belongs to them, the risks which they are organized to insure against being covered at times by marine companies at rates which are less than would be charged by the fire and casualty companies. The marine policy names one rate for the entire movement of the merchandise, including while at rest at one or more points on the way. The part of the marine rate which, if the rate could be split up, would be applicable to the period during which the merchandise is at rest in some location, is sometimes less than the fire and burglary rates applying to that location in the tariffs which are filed with the Insurance Departments and must be adhered to by the fire and casualty companies and those companies are consequently placed in a disadvantageous position.

Departmental Competition.—The marine companies recognize that this is unfair and welcome any proper means of disposing of this bitterly controversial question, in fact, most of the companies which do marine business also do fire business and their marine departments have been unfairly competing with their fire departments.

Interstate Underwriters Board.—In an attempt to solve the problem, a very complete organization, known as the Interstate Underwriters Board has been established, which in its rules, draws a line between forms of policy which are properly marine and those which should properly be issued as fire policies. The correct principle of separation seems to be that where the period during which the merchandise is at rest in a location is merely incidental to the transit from place to place, or where the movement of the merchandise or property is such that the convenience of the owner demands that he be furnished with a policy which covers this property wherever it may be, the business should be left to the marine companies and where these conditions do not obtain the business should be done by the fire companies. It is hoped that this organization will be successful in its undertaking and steps are being taken to compose the difficulties between marine and casualty companies in somewhat similar fashion.

CASUALTY AND MISCELLANEOUS INSURANCE

By A. Duncan Reid

President, Globe Indemnity Company, Newark, N. J.

AUTOMOBILE INSURANCE

General.—The most significant developments in casualty insurance during 1929 were those which concerned automobile insurance. In chronological sequence the three events of outstanding importance were (1) the general adoption by the insurance companies of installment payment plans for those desiring to pay automobile insurance premiums on that basis; (2) the general adoption of a so-called merit rating plan for private passenger automobile risks; (3) the enacting, by several states, of financial responsibility laws governing the ownership and operation of motor vehicles within these states, and designed to help bring about a greater degree of safety on streets and highways.

Installment Payments.—Installment payments made their appearance in January, 1929. The proponents of the plan contended that some sixteen or seventeen million automobile owners who presumably had been deterred from obtaining insurance because of the lump sum payments formerly required would favor an installment payment plan because of its popularity in many kinds of mercantile business and because of the opinion that purchase-payment methods are in keeping with present economic conditions. Although the insurance companies were not unanimous as to the need or practicability of a monthly payment basis for automobile premiums, during the early months of the year most of the companies placed at the disposal of their representatives, installment payment facilities which, while varying somewhat in *modus operandi,* embodied the same essential principles of installment financing. It is yet too early to determine the extent to which the sale of automobile insurance to desirable risks has been stimulated or facilitated by reason of installment payments. It would appear, however, that early considerations of the idea may have over-estimated the need for a plan of such financial accommodation and under-estimated the amount of detail work and financing machinery involved in its smooth and successful operation.

Merit Rating for Risks.—Merit rating for private passenger automobile risks embodied a plan approved March 28 by the National Bureau of Casualty and Surety Underwriters. The plan recognized the fact that the human element is probably the most important factor in automobile accidents and was based on the principle that the driver who has not for some time been involved in an accident is a better risk than the average and is entitled to a lower rate. The plan took the form of an endorsement clause allowing 10 per cent reduction in public liability and property damage (but not collision) premiums to the owner of a private passenger automobile whose record of ownership and operation, if it fulfilled the conditions, might be considered *prima facie* evidence of experienced and careful driving. The wording of this endorsement was subsequently modified in several particulars. The principal revised statements were to the effect (1) that the named assured had owned, maintanied and used or permitted to be used, a private passenger automobile for a period of not less than twenty-four months immediately prior to the effective date of the policy; (2) that no private passenger automobile owned by the named assured had been involved in an accident resulting in bodily injury or damage to property of another in consequence of which loss for either personal injury or property damage had been paid by the assured or by an insurance carrier in his behalf . . . during a period of twenty-one months beginning twenty-four months prior to the effective date of the policy and ending three months prior thereto; (3) that the assured's operating license had not been suspended or revoked for driving while intoxicated, reckless driving, etc., during the same period; (4) that the assured would keep brakes and steering gear in good working condition and have them inspected at least semi-annually and give written evidence of such inspection if called upon to do so.

In a number of states—Massachusetts, New Hampshire, Oklahoma, Texas, South Carolina and Iowa—the merit rate was not applicable. Its operation in states where it was approved would seem to indicate that to some extent, at least, it has accomplished the purpose of its originators which was to reward the careful driver, encourage a more active and more effective interest in the prevention of automobile accidents and to recognize, rate-wise, that type of automobile which is used generally for pleasure purposes, or for occasional business use, as differentiated from the car constantly exposed to accident hazards. In the practical application of the plan there have been, as was perhaps inevitable, several conflicts between theory and practice. The keen competition, for instance, in the sale of automobile insurance has made it difficult to restrict the granting of a ten per cent discount to those car-owners properly entitled to it under the terms of the endorsement—in other words, to prevent the plan from degenerating into a ten per cent rate reduction on the two forms of coverage to which it applies. Before the plan can be considered as a completely satisfactory vehicle for accomplishment the benefits originally claimed for it and in practical operation just and fair to insurance companies, to their representatives and to the insuring public, it is probable that several evolutionary changes may have to be made.

AUTOMOBILE LIABILITY INSURANCE

New State Laws.—Enactment by several states of motor vehicle financial responsibility laws is both directly concerned with, and supplementary to, the two innovations we have just reviewed. The serious situation to be kept in mind in connection with all three of these developments is that, despite the alarming increase of automobile accidents involving personal injuries and death as well as damage to property of others with resulting judgments for large amounts, only a very small proportion of car-owners carry automobile liability insurance. This means a tremendous number of motor vehicles being operated by those who are likely at any time to inflict injury or damage for which, in most instances, there could be no just redress.

The resistance encountered in selling insurance to such owners and operators may be lessened to some extent by the convenience of installment payments and by the money-saving feature of merit rating. Tremendously more effective, however, in increasing the percentage of insured car-owners is such legislation as went into effect during 1929 in the states of New York, New Jersey, Maine, Iowa and California, and which appears to be a much more satisfactory and workable corrective measure than the Compulsory Automobile Insurance Law of Massachusetts which went into effect in 1927, and the application of which has developed many serious problems.

Provisions of New Laws.—Although varying somewhat in their provisions and penalties, the underlying purpose of the financial responsibility acts of the five states above mentioned is to make responsibility for death, injury and property damage general. Under the provisions of these laws, car owners and operators are not required, as under the Massachusetts law, to prove financial responsibility in order to obtain an operator's license or to register a car. Upon proof of certain violations of the state highway or traffic laws, however, as set forth in these laws, the inability of any owner or operator to prove financial responsibility may result in the suspension of operator's or chauffeur's license and all automobile registration certificates until such person gives proof of his ability to compensate financially those whom he may injure in the future.

Violations for which the penalties of these acts are imposed include not only accidents which cause injury to a person or to property but also such infractions as reckless driving, speeding, driving while under the influence of liquor, etc.

Forms of Financial Responsibility.—The newly passed laws designate the following three forms of financial responsibility, any one of which is acceptable: (1) the certificate of an insurance company authorized to transact business in the state, recording its issuance to the motor vehicle owner or operator of a liability policy for limits not less than $5,000 for personal injury to or death of one person; $10,000 (subject to the foregoing limit per person) for such injury to or the death of two or more persons in one accident; $1,000 for damage to property of others resulting from any one such accident; (2) an approved surety bond for like amounts; (3) the deposit of cash or collateral with the state.

Application of Laws.—The influence of this legislation has been extended by making the provisions apply not only to motor vehicles owned and operated within the state but also to non-resident owners and operators. To summarize, these various motor vehicle financial responsibility acts have been enacted as a safety measure to enforce safe driving and careful use of the roads and to fix the responsibility upon the motorist (1) to avoid accidents and (2) to establish his ability to pay, within reasonable limits, the damages assessed against him for any accident in which he may unfortunately become involved. There seem to be well founded reasons for believing that such legislation is an equitable and effective way of accomplishing the desired results.

WORKMEN'S COMPENSATION INSURANCE

Developments.—No developments of a far-reaching character have taken place in the field of workmen's compensation. There have been the customary amendments to the various laws, usually in the direction of greater liberality of benefits. The rate-making bodies are constant in their endeavors to make rates adequate to the increasing cost of industrial accidents. Employers are showing a better disposition to co-operate with the insurance companies towards accident prevention. But there is always the human element, and the cost of workmen's compensation keeps persistently high.

Experience Rating.—The careful employer who uses every means to prevent accidents will benefit by an alteration in the experience rating plan which gives greater weight to the experience of the most recent years. Thus an employer who is instrumental in lowering the accident frequency and severity at his plant is not only doing his duty as a citizen and public benefactor but also enjoys the fruits in a lower cost for his insurance.

Legislation.—During the year, North Carolina enacted a Workmen's Compensation Law effective July 1st. There are now only four states which have not adopted the principles of Workmen's Compensation and where injured workmen have still to sue for damages,—Arkansas, Florida, Mississippi and South Carolina. When it is remembered that prior to 1911, the principle of workmen's compensation was practically unknown, or ignored, the rapid growth and development of the idea becomes at once apparent.

AVIATION

Aviation is now looming into the field of liability insurance and is fast becoming a very important factor in that field. The developments which the future undoubtedly holds for this means of transportation make aviation a subject of interest and importance to the insurance official who deals in futures.

INSURANCE AND THE STOCK MARKET

The year 1929 was marked by the entry into the casualty-surety field of many new casualty companies. It was also marked by a stock market collapse in October and November. In the process of readjustment to a safer and saner conception of actual values the protection afforded by insurance and surety bond coverage of all kinds will unquestionably be one of the most effective stabilizing influences. Existing conditions emphasize the basic service which the institution of insurance renders to the public,—namely that of protecting values which have already been created and of safeguarding the plans upon which every form of future accomplishment is based.

CHRONOLOGY OF FINANCIAL EVENTS, 1929

(From *The New York Times*, Dec. 31, 1929.)

JANUARY.

Jan. 2—Call money renews at 12%, falls to 10%; time money declines ¼ to 7½%. Stocks rise briskly; General Electric up 23¾ points to new high. Radio gains 20¼.

Jan. 3—Call money declines to 7%.

Jan. 4—Directors of Radio Corporation and Victor Talking Machine Company agree to merge. Van Swerigens and Baltimore & Ohio bolt from secret four-trunk-line conference, making direct pleas to Commerce Commission for purchase of railway properties. Call money 6%. Acceptance rates rise ¼ to 1% to 5@4¾ for 60 and 90 days. Pennsylvania crude oils rise 25 cents to highest level in 4½ years.

Jan. 7—Call money rises to 7%. Stock market weak, old Radio stock falls 20½ points.

Jan. 9—Call money down to 6%. Stocks rally slightly. Wheat rises 3 cents.

Jan. 10—J. D. Rockefeller Jr. asks proxies to oust Colonel Stewart as head of Standard Oil of Indiana. $21,000,000 in gold arrives from Canada.

Jan. 11—Call money 7%. Reichsbank rate reduced from 7% to 6½%.

Jan. 14—Time money up to 7¾%. Netherlands call $40,000,000 6% bonds offered in 1924.

Jan. 15—Call money rises to 9%. Stocks, wheat and cotton weaker.

Jan. 16—Call money 8%. Stocks rally. United States Government bonds weak, 1st Liberty 4¼s going below par for first time in five years.

Jan. 17.—Call money 6%.

Jan. 18—Bankers raise acceptance rates to 5⅛@5% for 90-day paper; above F. R. rediscount rate.

Jan. 19—J. P. Morgan and Owen D. Young accept offer of foreign governments to serve on experts' committee on reparations.

Jan. 22—First gold of year engaged for New York in London, $2,500,000. Copper up ¼ cent at 17c. Wheat strong.

Jan. 24—Bethlehem Steel resumes common dividend after 5-year lapse.

Jan. 25—Stocks very active, General Electric up 14⅞ points, du Pont up 16, and industrial average gaining 7½.

Jan. 26—A. T. & T. rises 13 points to 220, new high. Commerce Commission approves New York Central lease of Michigan Central and Big Four Roads.

Jan. 28—Stocks open with wide gains, Electric Bond and Share gaining 49 points on Curb. New York Central goes to high record of 199⅝ on unification plan approval.

Jan. 29—Call money 7%. Stock market grows nervous. London gold amounting to $5,500,000 arrives.

Jan. 30—Call money 8%. Utility stocks rise 2 to 16 points.

Jan. 31—Call money down to 7%, time money to 7½%. Du Pont gains 65 points in strong market.

FEBRUARY.

Feb. 1—Stock market rises rapidly, despite 8% call money; "averages" at new high record.

Feb. 4—Standard Oil Company of Indiana votes $310,000,000 distributions, in form of 50% stock and 50 cents extra dividends; seen as Stewart move to obtain stockholders' favor.

Feb. 5—Call money drops to 7%; time money advances to 7½@7¾.

Feb. 7—Stock market breaks heavily on overnight Reserve Board warning; "averages" down 7 points for day.

Feb. 8—Call money advances to 9%; stocks decline again, but more slowly.

Feb. 11—Stocks rally 3 to 12 points in light trading; call money down to 7%.

Feb. 13—Call money drops to 6% but 60-90-day time money rises to 7¾; stocks quiet.

Feb. 14—New York Reserve Bank fails to change bank rate after five-hour meeting; call money 6½%.

Feb. 15—Federal Advisory Council recommends that all member banks be urged directly by the Federal Reserve Banks to curb brokers' loans. Call money 10%; stocks break 3½ points on average.

Feb. 16—Break of 2 to 21 points in stocks.

Feb. 18—Dull market, 2 to 14 point rally in stocks; call money declines to 7. Congressmen introduce resolutions hostile to Reserve Board.

Feb. 19—Baltimore & Ohio files application with Commerce Commission to consolidate fifteen affiliated roads; call money 6%; stock rally continues.

Feb. 20—Chesapeake & Ohio files plan to consolidate twelve railways, in opposition to Baltimore & Ohio plan.

Feb. 21—Guaranty Trust and National Bank of Commerce plan $2,000,000,000 merger. Call money 6½%; stocks rise further.

Feb. 25—Call money 9%.

Feb. 26—Directors of United States Steel Corporation vote to increase common stock from 7,533,210 to 12,500,000 shares of $100 par value, adding $496,679,000 to capital and retiring $271,385,000 bonds.

Feb. 27—Call money down to 8%; stocks rise sharply.

Feb. 28—Whole market rises violently under leadership of Adams Express, up 60½ points. Call money reaches 10 per cent; industrial "averages" at new high level.

MARCH.

Mar. 1—Stocks advance in 6,021,300-share trading, largest of year to date, and exceeded only in November and December, 1928; gains range from 1 to 25 points. Call money 8%. First National Bank stock advances $600 in day.

Mar. 4—President Hoover inaugurated. Stocks break, "averages" declining 5¼ points. A. T. & T. plans to increase authorized capital by $500,000,000 to $2,000,000,000.

Mar. 5—Call money rises to 10%. Decline of stocks continues. Bankers Trust plans 10-for-1 split-up in stock. Sugar prices lowest in 15 years.

Mar. 6—U. S. Treasury offers $475,000,000 notes at 4¾%. Call money goes to 12%; stock market breaks 2 to 18 points.

Mar. 7—Call money 12%. Stocks rally in late trading. Van Sweringens buy full control of Wheeling & Lake Erie from New York Central and sell control of B., R. & O. to Baltimore & Ohio. Paul Warburg warns against stock market situation, criticizes Reserve Board. Stewart and Childs are ousted in proxy fights of Standard of Indiana and Childs Company.

Mar. 8—Call money 12%. Radio rises 38 points.

Mar. 12—Call money 6%. Treasury issue of 4¾s oversubscribed. Berlin ships $10,900,000 gold, first large transfer in two years.

Mar. 13—Commerce commission orders New York Central, Nickel Plate and Baltimore & Ohio to sell Wheeling & Lake Erie holdings.

Mar. 14—Call money 7%. Radio shares rise 33¾ points, industrial average up 6¾. Secretary Mellon advises purchase of bonds by investors.

Mar. 15—Copper at 21 cents. Stocks continue advance, Radio and General Motors leading.

Mar. 19—Money 10%. Hanover National and Central Union Trust in $722,000,000 merger. Irving Trust to split shares ten-for-one and to sell $10,000,000 new stock. Copper 22 cents.

Mar. 20—Copper 23 cents.

Mar. 21—Export copper rises to 23⅜ cents. Blair & Co. and Bank of America plan $500,000,000 merger. Call money 9%.

Mar. 22—Stocks break, averages down 5 points. Copper rises to 24 cents domestic. Bank of Netherlands advances rate from 4½ to 5½%.

Mar. 25—Call money 14%, highest since July, 1920. Decline in stocks continues. 90 stocks reaching new low prices for year; averages fall 8 points. Radio and I. T. & T. advance against market. Ticker tape 50 minutes late.

Mar. 26—Heavy liquidation brings Stock Exchange turnover of 8,246,740 shares, largest in history. Call money advances to 15, 17 and 20%. Late rally in stocks minimizes declines. Bonds decline to lowest levels of year; government issues also weak. Bond trading largest since June 12, 1928. All commodities break. Over 300 low records of year made on Stock Exchange.

Mar. 27—Stocks recover rapidly as National City Bank offers $25,000,000 in call loan market, to be used in five lots for each 1% advance in the call rate from 16 to 20%. Call money 15%, time money 8½. Industrial average up 9⅞ points. Stock Exchange votes three-day holiday over Easter.

Mar. 29—Congressional inquiry into stock speculation discussed at Washington.

APRIL.

Apr. 1—Call money rises to 15%. Stocks fall, industrial average declining 8¼ points. Reserve Board and Secretary Mellon confer on credit situation. National City and Farmers Loan and Trust merged.

Apr. 2—Stocks strong, industrial average up 5¼ points. Call money 12%; time money 9%, highest since 1907.

Apr. 3—Attorney General Mitchell rules oil limitation plan impossible under anti-trust laws. Call money drops to 8%.

Apr. 4—Stocks recover; call money falls to 6%. Reserve Board announces that if release of Reserve Bank credit "is not brought about by voluntary cooperation" the system "may adopt other methods of influencing the situation."

Apr. 8—I. R. T. loses 7-cent fare case before United States Supreme Court. Commerce Commission approves merger of Chesapeake & Ohio and Père Marquette.

Apr. 9—Call money 10%, stocks decline moderately. Copper down t 19¾ cents.

Apr. 10—Stocks rally moderately Clearing House votes charge o one-half of 1% for call loans placed by out-of-town banks. Coppe 19¼ cents. Woolworth proposes t double capital.

Apr. 11—Call money 9%; utilties lea rally in stocks.

Apr. 12—Call money 7%.

Apr. 15—U. S. Steel stockholders approve increase in common stock t

$1,250,000,000. Farrell predicts $1,500,000,000 sales in 1929. Stocks weak. W. C. Durant uses radio broadcast to attack Reserve Board. Declares board to be "alone responsible" for high Wall Street money rates and demands reduction of New York bank rate to 3%, the lowest ever fixed.

Apr. 16—Call money 9%. Bank of America acquires Nassau National Bank and Bank of United States acquires Municipal Bank and Trust Company. U. S. Steel offers $40,000,000 in rights, new stock to be issued at $140 a share on one-for-seven basis; will retire $135,000,000 bonds due 1951. Company to call $136,000,000 additional bonds later. Grain prices break on Capper statement that large surplus will remain unsold because freight rates are too high.

Apr. 17—Call money 7½%; time money easier. Reid offers resolution in House for investigation of Reserve Board.

Apr. 22—Acceptance rates cut ⅛ of 1% on all but 30-day bills; 60-90 day money at 8¼%.

Apr. 25—Reichsbank rate raised from 6½ to 7½%; call money here rises to 12. Stocks react.

Apr. 26—Call money 16%. National City and other banks loan funds for relief of brokers. Stocks rally moderately.

Apr. 29—Treasury official quoted anonymously as "not considering stocks dangerously high." Call money rises to 15%.

Apr. 30—Call money 10%; stocks strong.

MAY.

May 3—Call money 11%, time money dearer. Yield rate for 30-day acceptances raised ⅛ of 1% to 5⅝@5½%.

May 6—Call money 14%.

May 8—Time money advanced to 8¾%.

May 9—German Reichsbank sells $11,000,000 gold to Bank of France in exchange for equivalent transfer of its New York gold credits by French bank. Call money 10%, time money higher at 9.

May 10—Rise in stocks led by General Electric with 6¾-point gain, touching new high. Call money 6%, lowest since April 5.

May 13—Call money 7%. Stock market breaks, with pressure on industrials and utilities. Industrial average down 8⅞ points.

May 14—Call money 10%. Stocks rise sharply.

May 15—Sinclair remains at head of his company at annual shareholders' meeting, approved by large vote. Call money 15%. Copper producers order 10% cut in production.

May 16—General Motors buys 40% interest in Fokker Aircraft, to rival Ford in air. Equitable-Seaboard merger creates $859,600,000 bank, fourth largest in New York, fifth in country. Call money 14%.

May 17—Heavy break in wheat; May delivery reaches $1.01⅞, decline of nearly 12 cents in fortnight and 46 cents below same date in 1928. Corn and oats hold firm.

May 20—Wheat recovers to $1.03¼ after selling at $1.01. U. S. Supreme Court decides in favor of O'Fallon Road and against Commerce Commission with respect to valuations. Railway shares rise 5 to 25 points, then fall back 5 to 20. Call money 7%; industrial stock average down 8½ points.

May 22—Stocks break 2 to 18 points on news that Federal Reserve Advisory Council had recommended 6% New York Reserve bank rate. Averages down 8 points for day; 200 stocks at new low for year. Call money 6%. Time money 9¼%.

May 23—Market rallies on failure of New York bank to advance rate and on reports indicating Reserve Board meeting at Washington was divided, but voted against increase. Wall Street believed Secretary Mellon had cast deciding vote, but bankers' information was that he voted for advance. Time money at year's highest, 9½%.

May 27—Wheat below $1 at Chicago for first time in fourteen years; other grains break with it. Chicago grain speculators sell stocks in New York to raise funds for supporting wheat. Heavy decline follows; General Electric falls 13¼, Case Threshing 25.

May 28—Wheat falls to 96¼ cents; heavy liquidation by farmers reported.

May 31—Wheat down to 93¼ cents for May delivery, lowest price of 1929, lowest since September and below average May price in 10 years before the war. Grain trade estimates American unsold surplus 70,000,000 bushels above previous year.

JUNE.

June 3—Call money 7%, 4-6 months time money declined to 8¼. Wheat recovers 9 cents in wild trading, bears covering heavily. July closes at 103⅝, with net gain of 5⅜. Other grains and cotton also rally. New day loan fee of 1% per annum established by New York Clearing House Association.

June 4—Industrial stock average up 8¼ points, led by Commercial Solvents, Otis Elevator, Sears, Roebuck and Case Threshing. Wheat rose again, July closing at 108⅝, up 5 cents. Time money easier at 8¼%.

June 6—United States Treasury offers $400,000,000 certificates at 5⅛%, highest in eight years and comparing with 4% rate in June, 1928, and 3⅜% in June, 1927.

June 10—Call money 8%; time money falls to 8@8¼.

June 13—Call money 7%. Stocks rise sharply under lead of utilities.

June 14—J. P. Morgan & Co. sponsors merger of leading New York State utilities.

June 17—Merger of Chase National and National Park banks planned. Stock market strong, industrial average up 7 points.

June 19—Time money down ¼ to 7¾ @8%.

June 20—Food product merger planned by House of Morgan includes Fleischmann, Royal Baking Powder and E. W. Gillette Company, Ltd., with Chase and Sanborn to be included later.

June 24—Call money rises to 10%. Wheat goes to $1.16¾ on reports of destruction of Canadian crop by drought. Recovery since end of May, 23½ cents.

June 25—Stone & Webster offers $40,000,000 stock to outsiders in raising capital to $100,000,000. Industrial share average rises 4½ points to new high record.

June 27—Time money down 1¼% for all months, call money holds at 10%. Interstate Trust and Century Bank merge.

June 28—Stocks at new high average. Time money down 1¼% further.

June 29—Governor Roosevelt orders Attorney General Ward to investigate power mergers in State. Macy acquires L. Bamberger & Co., uniting stores with annual sales of $125,000,000. Stock averages reach new high level for fifth successive day.

June 30—Wabash asks right to weld fourteen roads into fifth trunk line system.

JULY.

July 1—Call money advances to 15%, time money fell to 7½.

July 2—Call money remained at 15%,
but stocks rose rapidly under lea
ership of United States Steel ar
General Electric, both of whic
reached new record prices. Ave
ages also made new records.

July 3—Call money, 6%. Wheat ros
2 cents in active market, July clo
ing at 119½.

July 4—American stocks rose vi
lently in London during holida
closing here. Bank of England r
serve ratio falls to 33.01, agains
44.79 the week before.

July 8—Money 9%, sterling up ½ cen
to 4.85⅜; move interpreted as art
ficial check to gold movement.

July 9—Acceptances rise ⅛ to 5¼ fo
30-90 days paper. Wheat falls 2
cents on profit taking.

July 12—Many stocks reach ne
high levels in strong market, wit
American Telephone, United State
Steel, Bethlehem, Chesapeake Cor
poration and Consolidate Gas th
features.

July 13—Stock averages up 4¼ point
to new high record. Curb E
change trading at record of 1
832,200 shares for a Saturday.

July 15—Call money 12%.

July 16—United States Steel Corpor
tion calls remaining funded debt
$133,372,000. Wheat falls 3½ to
cents after early rise.

July 17—Stocks advance as ca
money drops to 8%. Time mone
firmer at 7¾@8% for all month
New high record for average
Wheat rises 8½ cents on droug
news.

July 18—Call money 7%. Curb E
change seat sold at record price
$225,000.

July 19—United States Steel lea
market in 6½-point average gai
ending at new high of 208¼. Ne
York Central up 7⅞ points; Uni
Pacific and New Haven also fe
tures. Wheat drops 4 cents.

July 21—French Chamber ratifi
Mellon Béranger debt agreemen

July 22—General Electric advances
points to new high record, rest
list showing losses of 3 to 21 poin
Sterling rises 5-16 to $4.85 5-16
French ratification of Americ
debt in Paris. Wheat advances
cents on bad crop estimate.

July 23—Stock market advances u
der leadership of United Stat
Steel, Packard, General Electr
Chrysler and American Telepho

July 24—Call money 9%. Americ
Telephone up 8⅛ points to n
high, with other stocks genera
lower. Curb Exchange sets rec
trading of 3,584,700 shares.

July 25—Bethlehem Steel puts common stock on $6 dividend basis, highest rate since 1919. Consolidated Gas Company announces $78,000,000 stock issue. Four-for-one split-up of Baldwin Locomotive stock proposed. Cuba Cane Sugar Company announces reorganization plan. American Telephone advances 9½ points to new record. Call money 10%.

July 26—Call money 9%, time money rises to 8¼@8½. Sterling equals year's high of $4.85⅜, franc setting new high of 3.92⅜ cents.

July 29—Selling wave depresses stock market. General Electric loses 6⅞ points; other issues 2 to 11. Call money rises to 10%.

July 30—Attorney General Ward reports power merger legal. United States Steel reports second quarter net income of $72,000,000, highest since war. Time money advanced to 8¾% for 60-90 days. Stock market recovers despite 10% call money.

July 31—General Electric advances 10 points, United States Steel 3⅛ points, both setting new high records. Industrial average up 5¼ points to highest level. New York Real Estate Securities Exchange formed to deal chiefly in real estate securities.

AUGUST.

Aug. 1—Call money 12%, stock market advances under lead of utilities. American Telephone convertible bonds rose 8¼ points.

Aug. 2—Wheat falls 3½ cents. Call money 10%, time money up to 8¾@9. American Telephone, General Electric, Western Union and Consolidated Gas stock lead market.

Aug. 5—Wheat breaks 3 cents as grain deliveries flood market. Insull Utility shares collapse in Chicago and here, one falling 19 points. Call money 12%.

Aug. 6—Call money 8%, stock market lower. Wheat down 6½ cents.

Aug. 7—Wheat recovers 3¼ cents, shorts cover. Stocks continue to break with utility shares.

Aug. 8—New York Reserve Bank advances rate to 6%, stocks strong in ignorance of banks' action, taken after market's close. Call money 7% Sterling reaches gold point.

Aug. 9—Wide break in stocks in response to higher bank rate, trading very wild, industrial average down 15¼ points; General Electric loses 19 points, Commercial Solvents 30, American Telephone 10½. Stock Exchange transactions 5,000,000 shares, largest since March. Call money 8%, time money higher at 9%. Marconi International on Curb falls 20¼ points to 16¼.

Aug. 10—Market recovers part of previous day's losses. Trading light.

Aug. 12—Stocks continue rally; United States Steel leads with gain of 11⅝. Wheat down 3⅝ cents as supplies continue to accumulate.

Aug. 13—United States Steel rises to new record of 240½; rest of market continues to rise; call money down to 7%.

Aug. 14—Call money drops to 6%, time money is lower at 8¾@9. Stocks react mildly. United States Steel at new high of 245, and General Electric 399.

Aug. 15—Call money 7%.

Aug. 16—Stocks rush upward under lead of oils and utilities. Averages raised 7⅛ points.

Aug. 19—Cotton up $2 a bale on crop damage reports.

Aug. 21—Call money 6%. Wheat falls 5¾ cents.

Aug. 22—Stocks advance under leadership of General Electric, United States Steel, Montgomery Ward and Du Pont; Westinghouse gains 20¼ points. Transamerica Corporations declares 150% stock dividends.

Aug. 23—Market continues rise; Westinghouse Electric advances 12 more points. Call money 7%. Industrial average up 7¼.

Aug. 27—Call money 9%. New Haven common stock placed on $5 annual dividend basis.

Aug. 30—Interborough Transit settles $9,250,000 debt to New York City. Gasoline prices cut 3 cents in metropolitan area by leading companies, foreshadowing price war. Sterling at 4.84⅝, lowest since 1926.

SEPTEMBER.

Sept. 5—Stocks break wildly, industrial average down 10⅝ points. Roger Babson predicts "sooner or later" a crash which will "cause decline of 60 to 80 points in Dow-Jones barometer." Professor Irving Fisher replies that "there may be a recession, but not anything in the nature of a crash."

Sept. 6—Call money 6%; stocks recover nearly all previous day's losses; industrial average up 10¼ points.

Sept. 9—Market easier, call money 8%.

Sept. 10—Call money 10%; stock market breaks heavily.

Sept. 11—Call money 7%, time money rises to 9%.

Sept. 12—New York Stock Exchange announces plan to censor statements of investment trusts applying to list shares. Call money 8%.

Sept. 13—Call money falls to 7%. Niagara Hudson Power System buys Frontier Corporation, originally formed to develop St. Lawrence power in New York State.

Sept. 16—Stocks firm, call money 7½%.

Sept. 17—Call money 10%.

Sept. 19—Call money drops to 7%. Stock Exchange prices by TIMES averages reach year's highest.

Sept. 20—Stocks moderately lower, call money 8%.

Sept. 23—Stocks weak, call money 10%.

Sept. 24—Market breaks sharply, American Can down 5⅛ points, General Electric 5, Montgomery Ward 4⅛, Radio 3⅞, United States Steel 5¼. Industrial average down 9⅛ points.

Sept. 25—Market break arrested after 5 to 15 point losses in pivotal issues. Call money 10%.

Sept. 26—Bank of England rate advanced to 6½%. Call money 9%, time money 9@9¼. Stocks recover moderately. Sterling at $4.85⅝ highest since July. Wheat rises 3⅝ cents.

Sept. 27—Sharp decline in stocks. Allied Chemical loses 10¾ points, Columbia Carbon 17¼, Westinghouse 11, General Electric 12¾. Standard Gas rises 16½, American Water Works 9½. Industrial average down 11¾ points.

Sept. 29—Arthur Cutten, in published interview, declares himself "a bull on stocks"; insists that "$10,000,000,000 or $12,000,000,000 in brokers' loans would not be unduly large."

Sept. 30—Call money 10%.

OCTOBER.

Oct. 1—President of American Bankers Association, addressing annual convention, expresses "grave alarm" at pace of credit expansion; warns that "there is a limit beyond which bank credit in this country must not be expanded." Call money 10%.

Oct. 3—Heaviest decline in stocks thus far in 1929, industrial average down 19½ points. United States Steel falls 10, Standard Gas and Electric 25, General Electric 12¼, Westinghouse 17. Curb and other markets also weak. Final hour of trading on Stock Exchange shows 1,500,000 share trading. Call money 6%.

Oct. 4—Break in stocks continues, industrial average falls 6½ points. Tickers lag in 5,623,900 share trading, largest since March 26. Case Threshing down 25 points, General Electric 5½, Columbian Carbon 13.

Oct. 5—Stocks recover. American Telephone & Telegraph rises 8⅝, United States Steel 7¾, General Electric 10, American Tobacco B 38. Industrial average up 9½ points.

Oct. 7—Call money 6%, time money lower at 8¾@9. Moderate rally in stocks.

Oct. 8—Texas Corporation $100,000,000 debenture 5s offered by Continental Illinois Company, Inc., and others, at 98½, largest issue of kind since December, 1926.

Oct. 9—New York Central offers $35,669,900 new stock at 100, on basis of one share subscription rights for thirteen held. Call money 5%, lowest since Aug. 17, 1928. Time money 8½.

Oct. 10—Stocks rise, industrial average up 6⅝ points. Time money down to 8¼@8½%. Sterling above parity for first time since July 1928.

Oct. 14—Stocks ease moderately in 2,755,000-share trading, smallest since July 30. Spain abandoned effort to peg peseta, which falls ¾ cent. Call money 6%, time money 7½@7¾.

Oct. 15—Call money 7%. Charles E. Mitchell, from London, says "American markets generally are now in a healthy condition."

Oct. 16—Committee of Investmen Bankers Association reports to convention that speculation in publi service stocks has reached dange point and that many stocks ar selling far above intrinsic values Stock market breaks widely. Industrial average down 13 points General Electric falls 12, Unite States Steel 9⅝, Westinghouse 11½ All leading utility shares weak Time money lower at 7¼@7½%.

Oct 17—Stocks rally moderately, industrial average up 6⅞ points. New York City announces $60,000,00 bond plan.

Oct. 18—Stocks down again, Stee loses 7¼. Call money 5%. Sterlin rises to 4.87⅜, other foreign exchanges also strong.

Oct. 19—Market breaks 5 to 20 points; reports of large "bear pool." Trading 3,488,100 shares in two-hour day. Industrial average down 12.18 points.

Oct. 21—Stocks break 2 to 10 points, but rally on banking support. Record number of 920 stocks dealt in during 6,091,000-share day.

Oct. 22—Stocks rise 1 to 16 points, but run off at close. Steel up 1⅝, Western Union 18, Columbian Carbon up 16¾. Time money lower at 7@7¼%.

Oct. 23—Stocks crash 5 to 96 points, industrial average down 31 points. Total trading 6,374,960 shares, 2,600,000 in final hour. Opening was strong and market steady until noon, but break got under way in afternoon with increasing speed. Very extensive calling of margins. Steel down 8⅛ points, Montgomery Ward 9¼, Radio 11¾, Bethlehem Steel 6. Time money lower at 6¾@7¼%.

Oct. 24—Severest break to date occurs in 12,894,650-share trading, high record to date, 6,337,415 shares on Curb sets record there. Bankers meet at J. P. Morgan & Co., issue reassuring statement, bringing partial afternoon recovery. Industrial average down 12⅛ points for day. All other exchanges are weak. Wheat falls 10¾ cents at Chicago, other grains and commodities following. Time money lower at 6½@6¾%. Stock ticker four hours late.

Oct. 25—Market steadier. Hoover says business is sound. Business leaders all issue favorable reports on conditions. Stock Exchange authorities defer action on suspension of trading. Time money to 6½@7%, call money 6%.

Oct. 26—Weakness returns on stock market. Commission houses to remain open Sunday for catching up on books.

Oct. 28—Extreme panic breaks out on Monday market; all commission houses report selling at any sacrifice by speculative customers and rapid accumulation of exhausted margins. Transactions 9,212,000 shares; 3,000,000 sold in last hour; ticker 167 minutes behindhand. General average of stocks down 29¼ points, industrial average 49⅛, heaviest day's fall on record. Banking support reported to be forthcoming. Time money down to 6¼@6½%.

Oct. 29—Record trading for all time set as 16,410,030 shares change hands in further panicky break. Curb records 7,096,300 shares. Slight recovery in last 15 minutes. Industrial average falls 70¾ points, recovers 40⅞; general average down 24⅝ for day. Call money 6%, while time loans ease further to 6. New York City postpones $60,000,000 bond offering. United States Steel and Consolidated Gas declare extra dividends. Reserve Board authorities say no action by them is necessary, announce margins will be reduced to 25% for stock loans.

Oct. 30—Stocks rally as Rockefellers announce they are buying stocks; industrial average up 31 points. American Telephone & Telegraph rises 36 points, General Electric 25, Westinghouse 18½, while 10,727,320 shares change hands. Delivery time postponed to 4 P. M. Stock Exchange plans extra holidays to rest brokers.

Oct. 31—Stock Exchange opens at noon, continues rally. New York bank rate reduced to 5%. London rate drops to 6%, Irish rate to 6½% and Netherlands rate to 5%. Brokers' loans down $1,096,000,000 in week. $3,005,000 gold shipped to France, first movement of metal this year to any principal European country. United States Steel buys Columbia Steel Corporation. Stocks recover further; industrial average up 21 points for day, general average 12⅝. Bank clearings at New York at record high of $3,853,000,000 for single day.

NOVEMBER.

Nov. 1—Brokers work throughout week-end to clear up tangles resulting from market break; specialists required to be present on floor of Exchange over triple holiday. Over-the-counter trading forbidden to members of Stock Exchange during period.

Nov. 4—Stocks decline 2 to 17 points in orderly selling during three-hour trading day; sales 6,202,930 shares. Pennroad Corporation buys control of Pittsburgh & West Virginia from Taplins, upsetting Van Sweringen plans. Bankers' Capital Corporation in receiver's hands, assets of $1,744,602.

Nov. 6—Stocks break 5 to 66 points; United States Steel falls 18 points, making decline of 96¾ points since Sept. 3, or 37¼ per cent.

Nov. 7—After weak opening, stocks rally, closing 3 to 34 points higher; averages up 8 points. Brokers' loans down $656,000,000 in week to lowest since October, 1928. Stock ticker two hours behind market. National City Bank shareholders meeting reject terms of merger with Corn Exchange Bank as proposed Sept. 19 by National City directors and accepted by Corn Exchange shareholders. Proposal had agreed on cash purchase by National City, at 360, of Corn Exchange shares not exchanged for National City stock. Prices of Corn Exchange stock had fallen to 160 at beginning of November.

Nov. 8—Trading quieter, prices lower.

Nov. 9—Extra holiday on Stock Exchange. J. J. Riordan, head of County Trust, commits suicide. Directors, auditors and superintendent of banking report bank's condition sound. Raskob becomes acting chairman.

Nov. 11—United States Steel falls 11½ points in narrow market, leading general decline. Industrial average down 19⅝ points.

Nov. 12—Violent collapse in stocks; transactions 6,452,770 shares in three-hour market. United States Steel loses 6 points, Columbia Carbon 19⅞. Industrial average down 16 points. Acceptance bill rate is cut ⅛ per cent to lowest of year.

Nov. 13—Stocks break with great violence in 7,761,000-share market, reaching lowest prices of 1929. Industrial average declined 16⅛ points, then recovered 2⅝. Wall Street greatly depressed. Bid put in for "a million shares Standard Oil of New Jersey at 50." Stock Exchange governors call for daily statement of short sales by members. Treasury recommends reduction of 1 per cent in normal income tax rates for 1930.

Nov. 14—Sharp recovery in stocks; some advances of 15 to 25 points, average rises 13¾. Brokers' loans down $710,000,000 for week. Time money 5½ per cent. New York Reserve bank rate reduced from 5 per cent to 4½.

Nov. 15—Recovery in stocks continues; averages rise 10⅞ points. Brokers' loans reduced $710,000,000 in week. President Hoover summons industrial leaders to confer on the arresting of trade reaction. Bank rates reduced at Continental European centres, Berlin and Paris rates unchanged.

Nov. 18—Call money 5 per cent, time money drops to 5½@5¾ per cent.

Nov. 19—Stocks rally 2 to 14 points after early hesitation. American Can gains 7⅞, General Electric 9½, United States Steel 6½ points. Average rises 6.08 points.

Nov. 20—Stocks advance, industrial average rising 8½ points. Call money 4½ per cent, time money 5.

Nov. 21—White House conference gives out large estimates for 1930 construction expenditure. Treasury urges increase of $175,000,000 in appropriations for public building construction in next ten years. Henry Ford declares at Washington that the way to help business is to reduce prices and "start a movement to increase the general wage level." Bank of England rate reduced from 6 per cent to 5½. Stocks advance, industrial average up 8⅞ points.

Nov. 22—Washington conferees estimate $2,000,000,000 construction plans for 1930 to Hoover. Fred I Kent clashes with Senators, blaming tariff uncertainty for market break.

Nov. 25—Stock Exchange resumes five-hour trading day; market grows inactive. Time money 4¾@5 per cent. Stock Exchange drops daily questionnaire on short trading.

Nov. 26—Stocks decline on profit taking, industrial average falls 8 per cent.

Nov. 27—Stocks firm. Foreign exchange very strong; $5,350,000 gold leaves for France. Time money 4 per cent.

Nov. 28—Market closed four days over Thanksgiving week-end.

Nov. 30—Steel output down to 68 per cent of capacity; some plants at 3 per cent.

DECEMBER.

Dec. 2—$5,000,000 more gold sen Switzerland, making $10,000,000 i movement. Time money down t 4½@4¾, lowest since March, 1928 Stocks moderately firmer. Bethlehem Steel buys three west coas steel plants.

Dec. 3—Hoover's message to Congres expresses optimism, covering a aspects of trade and industry Stocks rally while message reache New York. Average of twenty-fiv industrial stocks gains 10.16 points fifty stocks advance 6.14 points Ford raises salaries $19,500,00 Sterling at $4.88 3-32, near gold export point.

Dec. 5—Four hundred leading business men form trade council. Treasury announces offer of $325,000,00 nine months' certificates at 3⅛ pe cent, lowest rate since Novembe 1927, and comparing with 5⅛ pe cent in June. Sterling at gold export point.

Dec. 6—Acceptance rates up ⅛ on 30 and 60 day bills. General Electric plans four-for-one stock split-up. Market advances briskly, industrial average gaining 11.65 points. Time money firmer at 4¾ per cent; $10,000,000 gold is sent to France, largest single transfer of year. Fox Theatre holdings are vested in board of trustees, with A. T. & T. and Halsey, Stuart & Co. represented, $91,000,000 is owed.

Dec. 9—Time money firmer at 4¾@5 per cent. Stock market eases lower, average for fifty stocks losing 3.70 points and twenty-five industrials 7.38 points. Mellon invites bids on $100,000,000 3⅛ bills.

Dec. 10—Time money 5 per cent. Unfilled steel orders as of Nov. 30 show 38,783 tons gain for month.

Dec. 11—City of New York offers $65,000,000 4½ per cent stocks and bonds for public works, National City syndicate pays $1,526,655 premium for issue.

Dec. 12—Stocks decline in widest break since Nov. 12. Bank of England rate is cut to 5 per cent, bringing rally on London Exchange; $18,500,000 gold is reported engaged here for transfer to England. Brokers' loans up $33,000,000 for week, first increase since Oct. 16.

Dec. 13—After further dip, market rallies sharply in late trading, United States Steel closing up 5½, Air Reduction up 5⅛, International Combustion up 5 and Radio up 4⅛. Shipment of $10,000,000 gold to England by National City makes $21,000,000 for movement, while $1,280,000 goes to Germany and $4,000,000 to France.

Dec. 14—United States Steel offers $31,320,000 in stock for Atlas Portland Cement. Fox trustees plan holding company for all properties. Reichstag approves $100,000,000 loan, Americans to share in financing. Stocks rally moderately under lead of railways.

Dec. 16—Stocks decline in light trading, United States Steel losing 7⅝ and fifty stocks declining 6.11 points; twenty-five industrials decline 10.47 points. Time money lower.

Dec. 17—Gold conversion office at Buenos Aires closed, with result that Argentina forsakes gold basis. Latin American exchanges and securities decline.

Dec. 18—American Piano Company in receivership.

Dec. 19—Stocks decline in brisk trading. Fox Film declines 9¾ points, General Electric 7 and Montgomery Ward 4⅜ points. New York Stock Exchange announces 10 per cent bonus to employes. International Combustion Engineering group in receivership, stock falls 4⅞ points. Brokers' loans decline $39,000,000 in week to low mark since September, 1927. President Hoover signs ratification of French debt settlement.

Dec. 20—I. C. C. plans to link nation's railroads into twenty-one systems, with two Canadian groups, two New England lines and five Eastern trunk lines; Wabash to be fifth trunk system with Pennsylvania, New York Central, Baltimore & Ohio and Chesapeake & Ohio-Nickel Plate other four. $16,250,000 gold sent to France on Olympic, largest single shipment in eighteen months. Call money rises to 5 per cent for first time since November. Stocks continue weak under lead of utilities, United States Steel dropping 5¾, Westinghouse 4⅝, General Electric 5.

Dec. 23—Call money 5½ per cent. Stocks decline again. Silver price down to 47¼ cents an ounce, lowest since 1915, Shanghai selling metal on collapse of Chinese pool.

Dec. 24—Lightest full day's trading since Aug. 13, 1928, only 1,996,050 shares change hands. First day in 1929 with transactions under 2,000,000. Chicago mail order houses cut prices 10 per cent on wide range of commodities.

Dec. 26—Call money advanced to 6 per cent. Stocks rally under lead of Standard Gas and Electric, up 6¾, and Standard Power and Light, up 21 on Curb, on reports of a reorganization of these companies involving the entry of new banking interests into the situation. Brokers' loans decline $58,000,000 in week, Federal Reserve reports, to low since Sept. 28, 1927.

Dec. 27—New banking group acquires substantial interest in $1,100,000,000 Standard Power and Light system and announce reorganization and expansion program.

Dec. 28—Union Tobacco Company retires from tobacco business by surrendering all brands to American Tobacco Company.

Dec. 30—Petition in involuntary bankruptcy filed against Stutz Motor Car Company and New York State Railways placed in hands of receiver.

COGNATE SOCIETIES

American Economic Assn., Northwestern University, Evanston, Ill.
American Fair Trade League, 71 W. 23rd St., New York, N. Y.
American Institute of Accounts, 135 Cedar St., New York, N. Y.
American Institute of Weights and Measures, 33 Rector St., New York City.
American Protective Tariff League, 33 E. 10th St., New York City.
American Realty Co., 1440 Broadway, New York City.
American Retailers' Assn., 128 West 31st St., New York City.
American Statistical Assn., Inc., 236 Wooster St., Washington, D. C.
Central Assn. of Accountants, 51 Chambers St., New York City.
Chamber of Commerce of the U. S. A., 1615 H St., N. W., Washington, D. C.
Consolidated Stock Exchange of New York, Exchange Floor, 14 Pearl St., N. Y. C.
Consumers' League of New York, 289 Fourth Ave., N. Y. C.
Coöperative League of America, 167 W. 12th St., New York City.
Economy League, 1021 Park Ave., New York, N. Y.
Fair Tariff League, 40 Rector St., New York City.
Federation of American Industries, Inc., 511 Fifth Ave., New York City.
Franco-American Board of Commerce and Industry, 90 Fifth Ave., New York City.
French Chamber of Commerce, 4 East 52nd Street, New York City.
General Society of Mechanics and Tradesmen of the City of N. Y., 18 W. 44th St., N. Y. C.
Home Market Club, 38 Chauncey St., Boston, Mass.
Institute of Economics, 26 Jackson Place, Washington, D. C.
International Accountants' Society, 50 Broadway, New York City.
International Free Trade League, Wilmington, Del., R. F. D. No. 2.
Italian Chamber of Commerce in N. Y., 27 Cleveland Place, N. Y. C.
League for Industrial Rights, 165 Broadway, New York City.
Merchants' and Consumers' League, 500 Fifth Ave., New York City.
National Assn. of Cost Accountants, 25 W. 43rd St., New York City.
National Association of Credit Men, 1 Park Ave., New York City, New York.
National Assn. of Real Estate Boards, 310 S. Michigan Ave., Chicago, Ill.
National Association of Retail Grocers, 601 Gumbel Bldg., Kansas City, Mo.
National Bureau of Economic Research, Inc., 474 W. 24th Street, New York City.
National Consumers' League, 156 Fifth Ave., New York City.
National Economic League, 6 Beacon St., Boston, Mass.
National Foreign Trade Council, 1 Hanover Square, New York City.
National Research Council, 29 West 39th St., New York City.
National Wholesale Grocers' Assn. of the U. S., 6 Harrison St., New York City.
New York Stock Exchange, 11 Wall Street, New York City.
Pan-American Advertising Assn., 32 Burling Slip, New York City.
Petroleum Export Assn., Inc., 25 West 43rd Street, New York City.
Protective Tariff League, 137 Centre St., New York City.
United Commercial Travelers of America, 632 No. Park St., Columbus, Ohio.

DIVISION XI

AGRICULTURE AND ALLIED INDUSTRIES

CONDITIONS OF AGRICULTURE

By Arthur M. Hyde

Secretary of Agriculture

FINANCIAL ASPECTS

Income and Prices.—Despite low crop yields, the total income earned by American agriculture in 1929 was probably higher than that of the previous year. Reduced production was offset quite largely, from the farmer's standpoint, by higher prices. In October, for example, the prices received by farmers for their principal products averaged 140 per cent of the pre-war level, compared with 137 per cent in October, 1928. For the crop season 1929-30 the farm-commodity price level should average 140 per cent of the pre-war level, or better. In the crop season 1921-22, when the postwar depression was at its worst, the farm-commodity price level averaged only 119 per cent of the pre-war average.

Commodity Prices Farmers Pay.—These figures should, of course, be considered in relation to the prices of the commodities that farmers usually buy. For several years the average of these prices has been comparatively stable, in the neighborhood of 156 per cent of the pre-war level. In other words, the unit exchange value, or the purchasing power, of farm commodities has improved. But the purchasing power of farm commodities is not an exact measure of agriculture's relative position in our economic system.

Net Farm Income.—Farmers' incomes depend on the quantity of goods they have to sell, as well as on the unit prices of these goods. Since the war the productivity of the average American agricultural worker has increased notably, and unit costs of production have declined. Fewer farmers have produced a greater output. Hence, net incomes on the farm have improved in recent years more than might be supposed from a study of relative prices and of purchasing-power index numbers. This is shown by the fact that the return earned on the current valuation of all agricultural property in the crop season 1928-29 is estimated to have been 4.7 per cent, compared with 1.4 per cent in 1921-22 and a deficit in 1920-21. Net farm incomes in recent years have increased, while the prices of the goods and services for which these incomes are usually disbursed have remained relatively constant.

The Farm Mortgage Debt.—But the improvement that has been achieved should not hide the fact that agricultural conditions are still far from satisfactory. Farm mortgage debt in the United States as of January, 1928, was estimated at $9,468,526,000, compared with an estimated total of $7,857,700,000 as of January 1, 1920. For a period of economic and financial deflation and of agricultural contraction, this is a heavy increase in mortgage debt. But the farm bankruptcy rate has declined in the last year or so.

AGRICULTURAL ADJUSTMENT

War and Post-war Factors.—Farmers have been at heavy expense to readjust their crop enterprises in harmony with the changed post-war situation, and the returns on this investment, though reasonably sure, tend to be delayed. In fact, the job of reorganizing agriculture from a war-time to a peace-time basis probably cost all the farmers made in the war-time period of expansion. In the case of foodstuffs, the farmers' losses in the depression period were much greater than their illusory gains in the preceding boom. Many years of good returns will be necessary to indemnify American agriculture for the damage it suffered in the post-war deflation period. In such circumstances agriculture suffers more than other industries, because its readjustment to changed market conditions is more difficult.

CROP AND MARKET CONDITIONS

1929 Drought.—In particularizing the situation, it will be convenient first to glance briefly at the crop and market conditions of 1929, and then to give the income data for the crop season 1928-29. Later figures are not available. Widespread drought during the growing season of 1929 dried up pastures and reduced crop yields below those of any recent years. The losses in production, however, were on the whole rather evenly distributed. Cool spring weather, with heavy rains, delayed planting in many sections of the West and Northwest. Planting was exceptionally backward in the states from Ohio to Missouri, where some corn was not put in the ground until July. Rainfall was light and spotty during the early summer, especially in the northern half of the country. A general drought developed during August, except in the far Southwest. Conditions improved somewhat during September, and some late crops turned out rather better than had been expected.

Crop Yields.—Growers planted a total acreage about equal to that of 1928. Yields were lower in practically all crops, except irrigated crops and some varieties of hay. The hay crops that turned out well made heavy growth before the drought became severe. All crops combined gave a yield per acre 5.8 per cent below that of 1928 and 2.6 per cent below the average for the preceding 10 years. Lower than average yields were experienced in 29 states. The western Great Plains suffered most from the drought. Yields were reduced along the Atlantic Coast from Massachusetts to North Carolina and in all the North Central States except Wisconsin. California and Washington suffered from drought during the winter of 1928-29, and California fruits were injured by a severe freeze in April. The late spring reduced yields somewhat in the other fruit-producing areas, except the apple-producing sections of Virginia and West Virginia.

Corn production was 2,621,000,000 bushels, or 215,000,000 bushels less than in 1928. With the exception of the crop of 1924, the 1929 corn crop was the smallest since 1918. The acreage in corn was smaller than in 1928; but reduced yields were the principal cause of the reduced production. New England, New York, and the Southern States east of the Mississippi River produced more corn than in 1928. Corn production in the northern part of the Corn Belt was not materially below that of the previous year. The yields were reduced most in the area just north of the Ohio River, in Missouri, in Kansas, and in the far Southwest.

Wheat production, winter and spring varieties combined, totaled about 792,000,000 bushels, compared with 902,000,000 bushels in 1928. This output was between 4 and 5 per cent less than the annual average for the previous five years, though the harvested acreage was about 9 per cent larger. The greatest decline was in spring wheat, the production of which was only 224,000,000 bushels, compared with 324,000,000 bushels in 1928. Durum wheat production was only 53,000,000 bushels, as against 93,000,000 bushels in the previous year. The acreage in durum wheat was only 80 per cent of the 1928 acreage. Production of winter wheat was about 10,000,000 bushels less than in 1928, though the acreage harvested was 10 per cent greater. The hard winter wheat crop in the western Great Plains was reduced materially. Soft winter wheat production, however, was somewhat above the unusually small crop of 1928 and nearly equal to the average for the previous five years. It seemed probable that the wheat crop, though smaller than that of the previous year, would return the growers at least an equal income. Returns from the winter wheats promised to be higher.

Oats, Barley and Flax.—Oats production was about 120,000,000 bushels less than the average for the preceding five years, and barley production was 104,000,000 bushels above that average. Flax production was only 16,100,000 bushels, compared with 18,700,000 bushels in 1928 and an average of 23,200,000 bushels for the preceding five years. Acreage seeded to flax was 17 per cent greater than in 1928, but yields were greatly reduced by frosts early in the year and by drought early in the summer.

Cotton production, according to the November estimate, was 15,009,000 bales, compared with 14,478,000 bales ginned in the previous year. This output was grown on an acreage only slightly below the record acreage of 1926. Yields, however, were greatly reduced by drought in Oklahoma and in much of Texas. The eastern part of the Cotton Belt had about an average yield. Potato production was about 354,000,000 bushels, compared with the excessive production of 464,000,000 bushels in 1928.

Tobacco production was above that of 1928 and above the average for the preceding five years. This crop was planted on an acreage nearly 6 per cent greater than that in the previous year, and yields were about the same. Moreover, the quality of the crop was better, while prices for most kinds were at least equal to those of the preceding year.

Fruit production was generally low. The apple crop was reduced in some of the Northern States by dry weather. The southern peach crop suffered from unfavorable weather at blooming time and from rain during the harvesting period. Citrus fruits in Florida suffered from drought in the winter of 1928-29 and bloomed only lightly in the spring. Deciduous fruits in California, as already noted, were damaged by a freeze in April. Yields of tree and vine fruits averaged about one-fourth less than in 1928.

LIVESTOCK

Financial Returns.—Further improvement was made by the livestock industry, though favorable trends were not as sharply defined as in 1928. Certain branches of the industry showed losses, but gross returns to livestock producers in the first eight months of the year were approximately $93,000,000 more than in the corresponding period of 1928. Gain in gross income from livestock was effected despite a decrease of 1,187,000,000 head of meat animals slaughtered under Federal inspection in the first eight months of 1929, compared with the number in the corresponding period of 1928. The increased return from a reduced volume of sales was partly the result of higher average prices and partly of a higher average weight in the animals slaughtered.

Cattle and Hogs.—Indications were that the total marketings of cattle and calves for the year 1929 would be somewhat less than in 1928 and would make the smallest total since 1921. Yet the prospect was for an increase in gross returns. Hog slaughter likewise was smaller during the first eight months of 1929 than in the corresponding period of 1928. The decrease was about 4 per cent. Average weights of the animals slaughtered, however, were considerably higher, and average prices for the period showed an advance of $1.24 a hundred pounds. Hence producers received nearly $81,250,000 more than in 1928. In general, the first three-fourths of the year was marked by constancy in supplies and prices. In the last quarter, however, market receipts of hogs were very heavy, and prices declined sharply.

Sheep and Lambs.—Sheep producers, unlike the producers of cattle and swine, marketed an increased number of animals in the first eight months of 1929, compared with the number marketed during the corresponding period of the previous year. In the 1929 period receipts of sheep and lambs at public markets were 6 per cent greater than in the first eight months of 1928. Federally inspected slaughter increased about 6½ per cent. This increase was happily accompanied by an increase in the gross money return to producers. It is estimated that this increase was nearly $7,000,000, or 7 per cent greater than in the first eight months of 1928. A high level of beef prices helped to increase the demand for lamb and mutton. Indications were that the gross returns of the sheep industry for 1929 would exceed those of any previous year in its history.

Wool.—Wool producers felt the effect of increased foreign competition. In June, 1929, the average price received for wool by the farmers of the United States was 30.2 cents a pound, compared with 38.7 cents a pound in June, 1928. This decline may be attributed largely to increased wool production in Australia. Many other countries have expanded their sheep and wool production in recent years under the stimulus of satisfactory wool prices. The world wool clip of the past season was probably 5 or 6 per cent greater than that of the previous season. In the United States the number of sheep continued to increase. Production of wool (fleece) in 1929 increased about 1 per cent over the production of 1928, and was estimated at about 302,000,000 pounds; it was 36 per cent greater than the production in 1922.

DAIRY INDUSTRY

Production and Prices.—In general the position of the dairy industry was favorable, though not as markedly so as it was in 1928. Prices of butter, cheese, and other dairy products did not average as high as they did the previous year, largely because dairy production increased generally during the spring and summer months. In the fall, however, dry pastures curtailed production.

Consumption during the year held up fairly well, compared with consumption in recent years. In the last eight years, despite a generally upward trend in dairy production, our domestic consumption of dairy products has consistently exceeded our domestic production by about 1 per cent. The dairy industry will continue to be stable as long as it is maintained upon a basis of production for domestic needs.

FRUIT AND VEGETABLE' INDUSTRY

Expansion in the fruit and vegetable industry has been rapid since the war, as is shown by the fact that receipts of fruits and vegetables at 11 large cities have doubled within the last seven years. Increases have been particularly striking in the receipts of some of the annually planted crops, notably lettuce, green peas, snap beans, cauliflower, spinach, carrots, and cantaloupes. Competition resulting from an increased supply of fresh products all the year round is felt very keenly by the canning industry.

POULTRY

Conditions in the poultry industry were very favorable in 1929. Producers received good prices for both poultry and eggs, and their costs of production were not unusually high. At the present writing, stocks of eggs are relatively low and supplies of poultry, though probably larger than at this time last year, are not burdensome. Some further increase in poultry supplies is in prospect. The industry is undergoing rapid changes, however, and the penalty for inefficiency is quickly felt.

AGRICULTURAL REVENUE

Gross Income.—As already noted, the latest figures available for the agricultural industry as a whole relate to the crop season 1928-29. In that season farm incomes averaged higher than those of any season since 1920-21, except in 1925-26. Aggregate gross income from agricultural production in the United States for the crop season 1928-29 is estimated to have been $12,257,000,000. This was about $225,000,000 more than the aggregate gross income of the preceding year. From the sale of farm products, agriculture received a cash income estimated at $9,949,000,000, or an increase of $79,000,000 over the corresponding figure for 1927-28.

Net income of the farmers did not increase proportionately, because farm operating costs, taxes, and interest on debts advanced somewhat. The income available for living on the farm, including the value of farm products used by farm families, was only about $16,000,000 greater than•in the previous season.

Income Analysis.—Higher prices for livestock and livestock products were the principal cause of the improvement in the 1928-29 season's agricultural income. Increased unit prices more than offset a reduction in the volume of cattle, hog, and lamb sales. Income from meat animals was $145,000,000 more than in 1927-28, and income from dairy and poultry products was more than $200,000,000 greater. Income from grains and fruits and vegetables, on the other hand, was smaller. Reduction in the income from wheat and from potatoes was heavy, the markets for these products being oversupplied.

FARM LAND VALUES

Nominal Decline.—A survey made by the Department of Agriculture for the 12 months ended March 1, 1929, showed that for the country as a whole farm-land values declined by 1 per cent. This was the smallest loss in any year since the post-war depression began and was nominal compared with the declines of 1921, 1922, 1923, and 1924. State and regional averages as a rule showed few of the sharp declines frequently recorded in the years immediately preceding. In the North Central States, for example, the year's decreases did not exceed the national average of 1 per cent. Values in the Southern States likewise declined only slightly during the 12-month period in question. In the Mountain States and the Pacific Coast States values held up well toward the previous year's level, and in a few states, including Montana, Wyoming, Arizona, and New Mexico, a slight upward tendency was manifest.

Changes in Realty Values.—Current changes in farm-realty values are of course largely an outgrowth of economic disturbances caused by the war. In the post-war "boom" farm real-estate values for the United States as a whole rose to a level averaging 70 per cent above the pre-war level. Then followed a drastic decline to a present level 16 per cent above the pre-war average. Thus for the country as a whole, up to March 1, 1929, more than three-fourths of the wartime gain over pre-war levels had been cancelled. In some states the drop considerably exceeded the national average and carried average values to pre-war levels or below. These percentages, moreover, make no allowance for changes in the value of the dollar. When allowance is made for the decline that has taken place in the purchasing power of the dollar during the last 14 years, it appears that farm real-estate values for the United States as a whole on March 1, 1929, were 20 per cent lower than in March, 1914. In other words, an acre of land that in 1914 could have been exchanged for 100 commodity units would have brought only 80 such units in March last.

Capitalization Structure.—Agriculture cannot be continuously prosperous unless the structure of its capitalization is sound. Mistakes in this field may largely offset the value of efficient farm management, good adjustment of production to demand, orderly marketing, and intelligent use of land resources. Adequate research and analysis of the farm-land value situation would have disclosed. some of the weaknesses that came to light after the war, and served as a useful warning against inflation. Though farm-land values appear to be in sounder relation to farm earnings than during the boom period, they may again become overcapitalized, if precautions are not taken. Adequate research is the first necessity. The Department of Agriculture is engaged in studies as comprehensive as its resources for the work permit.

MECHANICAL EVOLUTION IN FARMING

Cultivation Increase.—In recent years a rapid technical evolution has taken place in American agriculture, characterized distinctively by a substitution of mechanical power for human and animal labor. Most of the change has developed since the European war. Comparisons limited to the post-war period are not available. Some idea of the magnitude of the change can be gained, however, from the fact that between 1870 and 1925 the average area of improved land cultivated per farm worker increased from 32 to 49 acres, or slightly more than 50 per cent. In the same period the value of machinery on farms in terms of 1913 dollars increased tenfold, or from $270,000,000 to $2,700,000,000. In value of machinery per farm worker, in terms of 1913 dollars, the increase was from $36 in 1870 to $200 in 1925, a gain of 455 per cent.

Technical Progress in Production.—American farm workers using mechanical power now produce from two to five times as much as similar workers in the older countries of Europe. Though all parts of the country have been affected more or less by this technical progress, the western grain-growing areas have been affected most. Mechanical power is rapidly replacing horsepower in heavy work such as plowing and disking in all parts of the country, and in the last few years machinery has become important for cultivating row crops and for grain harvesting.

Tractors.—An indication of the rapidly growing use of mechanical power on farms is the increase in the number of tractors manufactured in this country. In 1917 the number produced was 62,742. Though this was double the production of 1916, it was less than half the number turned out in 1918. It is estimated that in 1928 there were approximately 853,000 tractors on American farms. Tractors have recently been greatly improved in design and construction. The early farm tractors were large and proved unwieldly on land already under cultivation. Then followed a reaction toward very small tractors. To-day a middle course is followed; the tractors now turned out are somewhat larger than those that were popular a few years ago. In the northern Great Plains region the 3-plow and the 4-plow tractors are coming rapidly into use, and there is some demand for 6-plow tractors.

Equipment and Larger Farms.—Large power units of farm equipment are undoubtedly the chief cause of the recently accelerated trend toward an increase in the size of farms. It has been estimated that from 1915 to 1917 Montana had about 35,000 wheat farmers, many of them operating half-section or small farms. To-day Montana probably has not more than 14,000 wheat farmers. These men, however, are handling more acres and doing the work better than it was formerly done by 35,000 farmers. New types of implements for cultivating summer fallow have helped to increase the size of farms in the Plains and in the Mountain States of the West.

Cultivators.—One of these implements is called the "duckfoot." Use of the duckfoot first became general in the Columbia River Basin, and spread therefrom to Montana and other states east of the Rockies. Some wheat growers in the State of Washington substitute this implement for the plow. One farmer in that state, using 16-horse teams on 12-foot duckfoot cultivators as a substitute for plows, is able to farm 1600 acres per man. Another new implement that is gaining in popularity in the central and northern plains region is the 1-way disk summer-fallow cultivator, which permits a more effective cultivation and results in better yields.

Combined Harvester-thresher.—Outstanding in post-war mechanical developments in agriculture is the rise of the combined harvester-thresher (known everywhere among farmers as the "combine") in the territory east of the Rockies, where it was formerly believed that wheat could not be left standing until ripe enough to be harvested by the combine. When the practicability of the new method of harvesting was demonstrated for the Plains region, the introduction of the combine was extremely rapid. In 1926, 30 per cent of the Kansas wheat crop was harvested by the combine, 8274 machines being used in the work. In 1928 Kansas had 20,000 combines. The combine appeared in North Dakota for the first time in 1925. Three years later in that state 1000 combines were used in small-grain harvesting. In 1929 more than half of our hard winter wheat, one-fifth of our hard spring wheat, and a smaller proportion of our soft winter wheat, was harvested by combines. This machine eliminates the grain binder, the shocking of the wheat, the stacking, and the use of the threshing machine. It reduces the cost of harvesting to a small fraction of what it formerly was. A serious problem connected with the use of the combine is the fact that much combined grain contains more moisture than grain may safely contain when put in a bin. Accordingly, means are being studied whereby the moisture content of grain may be reduced before it is placed in storage. Indications are that a solution of this problem will be found.

AGRICULTURAL MARKETING ACT

Purposes.—Outstanding among the events of 1929 was the passage of the Agricultural Marketing Act. This measure, the result of eight years of discussion in the press, in agricultural circles, and in Congress, is essentially intended to enable agriculture to effect a better adjustment of production to demand and a more efficient system of marketing. Its adoption closed a period of debate and opened one of action. Though opinion was sharply divided during the preparation of the law, its enactment was hailed with general approval and satisfaction. The program as set forth in the Agricultural Marketing Act contemplates: (1) strengthening of the bargaining power of producers and increasing the efficiency of their marketing operations through the development of effective coöperative-selling associations, stabilization corporations and clearing houses; (2) stabilizing the supply of agricultural products and minimizing fluctuations in prices by preventing surplus production in so far as possible, and by effective distribution of surpluses once produced; (3) assisting in developing a national agricultural policy with reference to land utilization and marginal lands; (4) assisting in broadening markets for agricultural products at home and abroad and, more specifically, through the development of by-products of and new uses for agricultural commodities; (5) helping to correct maladjustments in transportation conditions that work hardships on agricultural producers in any section of the country; and (6) assisting in minimizing undesirable speculation in agricultural commodities and eliminating waste in their distribution.

Departmental Coöperation.—In creating this new agency Congress intended that it should not supersede the Department of Agriculture and other existing agencies, but should coordinate its activities with those agencies. Close coöperation between the Federal Farm Board and the Department of Agriculture is necessary. The terms of the Agricultural Marketing Act show that Congress did not intend to create a new Federal agency with duties overlapping those of the Department. Such a course would weaken one or both organizations. But the Board is clearly expected to supplement some of the department's work. In the great task of reorganizing agriculture in many important respects, the board will be on the firing line while the department will, to a large extent, make and supply ammunition. As an organization for research and for service to agriculture and for the enforcement of regulatory laws, the department will continue to function as it has done in the past. It is not the suitable agency to make practical application of all the facts its investigations bring to light, nor has it the legal authority to do so. In this field the board can do what the department cannot do.

THE AGRICULTURAL COÖPERATIVE MOVEMENT

Larger Coöperative Units.—In view of the important functions assigned to the coöperative association in the Federal Farm Board's program, it will be useful to glance at the status of the American coöperative movement. The last four or five years have seen a very strong trend toward an increase in the size of coöperative units and a disposition among them to federate for coordinated marketing. One striking index of the present status of the American coöperative movement may be seen in the fact that more than 200 farmer-owned associations now each transact an annual business exceeding $1,000,000.

Need for Closer Coördination.—Nevertheless, the movement is still made up largely of unrelated units that inevitably work to some extent at cross-purposes. More than 90 per cent of the associations now functioning are independent local or regional bodies having little contact with other coöperatives. For example, more than 300 associations market potatoes. There are 6 or 7 large associations that handle from 1500 to 8000 cars annually, but this represents only a fraction of our potato production. As a result, potato selling is highly competitive, and little progress has been made in adjusting the production of potatoes to the probable demand. Efforts toward coördinated production and marketing in one region tend to be nullified by unregulated production and haphazard marketing elsewhere. The same condition exists in many other branches of agriculture. Centralized organizations for the purpose of coördinated marketing are indispensable if full advantage is to be taken of the Agricultural Marketing Act.

AGRICULTURAL LEGISLATION

By M. S. Eisenhower

Director of Information, Department of Agriculture

AGRICULTURAL MARKETING ACT

Provisions of Bill.—Outstanding among the Congressional enactments of 1929 was the passage of the Agricultural Marketing Act. This measure, the outcome of prolonged discussion in Congress and in agricultural circles, established a Federal Farm Board commissioned to assist agriculture in adjusting its production to market requirements, and in improving its marketing system. It differs from the farm relief measures offered at previous sessions of Congress in not containing the equalization fee, a device proposed as a means of financing possible losses on export sales of agricultural commodities. The House of Representatives passed the Agricultural Marketing Act on April 25 by a vote of 367 to 34. On May 14 the Senate, by a vote of 54 to 32, passed a similar measure with the addition of a debenture clause. Conferees of the two houses, however, failed to agree on the inclusion of the debenture provision, and accordingly on June 14 the Senate adopted the farm relief bill minus that much-debated proposal. The vote was 74 to 8. The measure was signed by the President. It authorizes an appropriation of $500,000,000, and Congress made $151,500,000 immediately available.

Federal Farm Board.—The Act created a Federal Farm Board of eight members and the Secretary of Agriculture as an *ex officio* member. It directs the board to promote the effective merchandising of agricultural commodities in interstate commerce. As means to this end the Act calls for efforts to minimize speculation, to correct inefficient and wasteful methods of distribution, to encourage the organization of producers in coöperative associations—producer-owned and controlled—to assist farmers in forestalling the production of surpluses when that is possible, and to regulate the marketing of such surpluses as might be produced unavoidably. The $500,000,000 authorization is intended for use as a revolving fund in making loans to coöperative associations, and to stabilization corporations sanctioned under the Act.

Marketing Problems.—The Board is authorized to study prices and market prospects so that it may advise farmers in the prevention of overproduction. It is authorized, also, to make investigations and publish findings on land utilization, on methods of expanding the domestic and the foreign market for farm products, on the development of new uses for agricultural by-products, on transportation conditions affecting agriculture, and on other pressing agricultural problems. It is required by the terms of the law to work through farmers' coöperative associations, to which bodies it may make loans for marketing purposes, and for the provision for physical facilities for the handling of crops. So that organizations handling the same commodities or groups of related commodities may not work at cross purposes, the Marketing Act specifically forbids the use of funds by the Federal Farm Board when such use would tend to increase selling competition. This feature of the Act is designed to promote greater coordination in agricultural marketing.

MIGRATORY BIRD ACT

The Migratory Bird Conservation Act, approved February 18, 1929, authorizes the Secretary of Agriculture to purchase or rent areas of land or water when the acquisition of such areas is deemed necessary for the conservation of migratory game birds. A Commission was created by the Act to determine such questions. The Act also authorizes the acquisition by gift or devise of areas appropriate for use as inviolate sanctuaries of migratory birds, provided the states in which such areas lie consent to their acquisition by the United States Government. The Act forbids the destruction or injuring of any improvement or property of the United States on such areas and also forbids the taking of any bird, nest, or egg thereon. Violations of the Act are made misdemeanors punishable by fine or imprisonment, or both.

PORTO RICAN RELIEF

Creation of a Commission consisting of the Secretaries of the Treasury, War, and Agriculture was provided for in a Joint Resolution approved December 21, 1928, to assist the rehabilitation of agriculture in Porto Rico where great damage had been done by a hurricane. The Resolution authorized an appropriation of $6,000,000 for use as a revolving fund in making loans to farmers. It provided $100,000 for the purchase and distribution of seeds within the devastated area, and $2,000,000 for the rebuilding of schools and roads. The first deficiency appropriation, enacted March 4, 1929, made available $7,130,000 for carrying out the provisions of the hurricane relief resolution.

LEGISLATION AFFECTING ALASKA

Additional land for the use of the Alaska Agricultural College and School of Mines was made available by an Act approved January 1, 1929. This measure affected 100,000 acres of vacant non-mineral, surveyed but unreserved public lands in the Territory of Alaska. The benefits of the Hatch Act, which provides for the establishment of agricultural experiment stations in connection with the state colleges of agriculture and mechanic arts, were extended to the Territory of Alaska by an Act approved February 23, 1929. The same measure also extended to Alaska the benefits of the Smith-Lever Act, which provides for coöperative extension work between the Department of Agriculture and the state colleges of agriculture and mechanic arts.

MISCELLANEOUS ACTS

Forestry.—Further legislation was passed relating to the National Forests. By an Act approved January 30, 1929, Congress authorized the exchange of public lands and privately owned lands in Montana, and the addition of such lands to the nearest National Forest. Similar legislation affecting lands within the boundaries of the Lincoln National Forest was approved February 7, 1929. The acquisition of lands or water rights necessary for forest tree nurseries or for additions to existing nurseries was authorized. An Act approved February 28, 1929, appropriated $35,000 to enable the Secretary of Agriculture to construct and maintain improvements for the convenience of the visiting public within or near the Oregon caves in the Siskiyou National Forest in Oregon.

Mediterranean Fruit Fly.—By a Joint Resolution approved May 2, 1929, Congress made available $4,250,000 to meet the emergency caused by the entry of the Mediterranean fruit fly into the United States. The Resolution provided that in the discretion of the Secretary of Agriculture, no expenditure should be made from the appropriation until a sum adequate for state coöperation in the work had been appropriated, subscribed, or contributed by state, county, or local authorities, or by individuals or organizations.

Tobacco.—By an Act approved January 4, 1929, the Secretary of Agriculture was authorized to collect and publish statistics of the quantity of leaf tobacco in the possession of dealers, manufacturers, growers' cooperative associations, and warehousemen, etc. The same measure directed the Secretary to establish standards for the classification of tobacco. Wilful neglect to furnish the information required by the Act, and the furnishing of false or misleading information is punishable by fine or imprisonment.

Potash.—Joint action by the Department of Agriculture and the Department of Commerce to develop improved methods of recovering potash from leucite, alunite, and other potash-bearing deposits was provided for in an Act approved February 20, 1929.

THE TARIFF AND AGRICULTURE

Pending House Bill.—The House of Representatives on May 28, by a vote of 264 to 147, passed a general Tariff Bill reported by its Committee on Ways and Means. At this writing the Senate is revising the measure. As passed by the House, the measure carries increases in duties on articles in all schedules of the existing Tariff Act and provides for reorganization of the Federal Tariff Commission. It carries authorization for the President to end the terms of the six incumbent Commissioners at his discretion, and to nominate members without reference to their party affiliations. Under the existing tariff law the Federal Tariff Commission has six members, not more than three of whom may be of the same political party. The House bill provides for a Commission of seven members.

Proposed Changes in Duties.—Among the changes proposed in the House bill is an increase of 0.64 of 1 cent a pound in the duty on Cuban raw sugar, which would raise the duty from 1.76 cents to 2.40 cents a pound. Advances are proposed also on wool, live cattle and meats, dairy products, grains, textiles, glass, paper, furniture, and clothing. Among the articles it would transfer from the free list to the dutiable list are hides, leather, boots, shoes, cement, brick, shingles, and cedar, maple, and birch lumber. Increases on certain materials used in manufactures would be accompanied by compensatory increases on the finished products. Duties on cotton manufactures would be increased, but raw cotton would be on the free list.

No changes would be made in the present duties on oats, barley, and rye. On buckwheat the rate would be raised from 10 to 25 cents a hundred pounds. On wheat the present duty of 42 cents a bushel would remain unchanged, but the House adopted a committee amendment preventing Canadian wheat brought into this country for milling in bond from enjoying the preferential privilege granted American flour by Cuba. Imported wheat milled in bond, when exported to a country granting preferential rates to American products, would pay a duty equal to the amount of the preferential treatment.

Duties on vegetables, nuts, and fruits would be increased. The duty on beef and veal would be raised from 3 to 6 cents a pound, that on sheep from $2 to $3 a head, and that on swine from ½ cent to 2 cents a pound. The present duty of 1½ cents a pound on cattle weighing less than 1,050 pounds each and of 2 cents a pound on cattle weighing 1,050 pounds or more is replaced by a provision that cattle weighing less than 800 pounds shall carry a duty of 2 cents and those weighing 800 pounds or more shall pay duty of 2½ cents a pound.

The bill would raise the duty on butter from 12 to 14 cents a pound, and oleomargarine and other butter substitutes would pay duty of 14 cents a pound. On corn the duty would be raised from 10 to 25 cents a bushel; on figs, from 2 to 5 cents a pound; on limes, from 1 to 2 cents a pound; on flaxseed, from 56 to 63 cents a pound. The duty on soybeans would be 2 cents a pound, as compared with ½ cent under the present act, and the duty on potatoes would be 75 cents per 100 pounds, as compared with 50 cents at present. The duty on milk would be increased from 2½ cents to 5 cents a gallon, and that on cream from 20 to 48 cents.

GRAIN AND COTTON CROPS

By W. F. Callander

Chairman, Crop Reporting Board, Department of Agriculture

DECREASED GRAIN PRODUCTION

The combined production of grain crops (in bushels) in the United States in 1929 decreased about 10 per cent from 1928, while the gross value based on Dec. 1 farm prices decreased about 5 per cent according to the December estimates of the Crop Reporting Board of the Department of Agriculture issued Dec. 18. The combined production of 1929 was 5,186,000,000 bushels as compared with 5,792,000 bushels in 1928 and the 5-year average (from 1923-1927) of 5,363,000,000 bushels. The combined value of grain crops (Dec. 1 farm prices) for 1929 was $3,801,000,000 as compared with $4,007,000,000 for 1928.

COTTON

Value and Production.—An increase of 3 per cent in cotton production was accompanied by a decrease of 7 per cent in the value of cotton lint and cotton seed on the basis of Dec. 1 farm prices. The value of cotton and cotton seed was $1,426,000,000 in 1929, and $1,534,000,000 in 1928. The Dec. 1 farm price of cotton (lint) was 16.4 cents per pound and cotton seed $30.33 per ton in 1929, while the year before the prices were 18 cents per pound and $36.28 per ton. The combined value of cotton and grain crops for 1929 was approximately $5,227,000,000 which was also about 6 per cent less than the year previous, when the combined value was about $5,541,000,000.

Ginnings and Total Crop.—The total ginnings for the 1929 crop were estimated at 14,919,000 bales by the Crop Reporting Board in its report of Dec. 9. The production forecasts of September, October and November were each within 1 per cent or less of the December estimate, while the early season forecast of Aug. 1 was about 4 per cent higher than the Dec. 1 estimate. A year ago the December estimate of cotton production was 99.3 per cent and in 1927, 98.7 per cent of the final ginnings secured by the Census Bureau. The production of cotton this year of 14,919,000 bales was about 3 per cent greater than in 1928, and 5 per cent larger than the five year average from 1923-1927.

Cotton Acreage.—The acreage of cotton harvested in 1929 was increased in all states except North and South Carolina and Florida. The largest increases in the more important cotton states were 6 per cent in Oklahoma, 4 per cent in Arkansas, and 3 per cent in Louisiana. There was a decrease of cotton acreage of 4 per cent in North Carolina and nearly 8 per cent in South Carolina. The total increase in cotton acreage for the United States was 1.4 per cent.

Cotton Yield By States.—The estimated average yield per acre of cotton (lint) of 155.3 pounds in 1929 was exactly equal to the 10-year average (1918-1927) and about two pounds greater than the average for last year of 152.9 pounds. Large increases in production averaging 24 per cent in South Carolina, Georgia, Alabama, Mississippi, Arkansas, Louisiana, Tennessee, California and Missouri, were nearly offset by a decrease of nearly 23 per cent in Texas and 12 per cent in North Carolina. There were only slight changes in production in Oklahoma, Virginia, New Mexico, and Arizona. The estimated production of cotton in the more important cotton producing states in 1929 was as follows: Texas 3,950,000 bales, Oklahoma 1,915,000, Arkansas 1,490,000, Georgia 1,345,000, Alabama 1,335,000, Oklahoma 1,200,000, South Carolina 845,000, Louisiana 810,000, North Carolina 735,000, Tennessee 515,000, California 242,000, Missouri 215,000, Arizona 156,000, New Mexico 84,000, Virginia 46,000 and Florida 29,000 bales. In 1928 the final revised estimate of cotton production based on the ginnings report was as follows: Texas, 5,106,000 bales; Mississippi, 1,475,000; Arkansas, 1,246,000; Oklahoma, 1,205,000; Alabama, 1,109,000; Georgia, 1,030,000; North Carolina, 836,000; South Carolina, 726,000; Louisiana, 691,000; Tennessee, 428,000; California, 172,000; Arizona, 149,000; Missouri, 147,000; New Mexico, 88,000; Virginia, 44,000, and Florida, 19,000.

WHEAT

Acreage and Production.—The entire wheat crop of the United States in 1929 of 807,000,000 bushels approximated very closely the 5-year average (1923-1927) crop of 810,000,000 bushels, and was nearly 12 per cent smaller than the crop of 1928. Although the acreage of all wheat of 61,141,000 acres was 5 per cent larger than the 1928 acreage of 58,272,000, the average yield was only 13.2 bushels per acre as compared with 15.7 bushels in 1928 and a ten year average of 14.1 bushels. While the total production of all wheat in 1929 was 12 per cent less than in 1928, total value decreased only about 5 per cent, or from $887,000,000 to $841,000,000. The Dec. 1 farm price was 104 cents in 1929 and 97 cents in 1928.

Winter Wheat.—The increase in winter wheat acreage from 36,213,000 acres in 1928 to 40,162,000 acres in 1929 was practically offset by a decrease in the average yield from 16 bushels per acre to 14.4 bushels. The 5-year average production is 549,000,000 bushels and the 10-year average yield per acre is 14.9 bushels. The 1929 crop of 578,336,000 bushels was worth (Dec. 1 farm prices) about $616,128,000 as compared with the 1928 crop of 578,673,000 bushels worth $599,000,000. The Dec. 1 farm ~rice was 106 cents in 1929 and 104 cents in 1928.

Durum Wheat.—The production of durum wheat in the four important producing states in 1929 of about 52,000,000 bushels was only a little more than half of the 1928 production, and also below the 5-year average production of 60,000,000 bushels. This sharp decrease in production was the result of a decrease in acreage of about 22 per cent and in yield per acre from 14.2 bushels in 1928 to only 9.9 bushels in 1929. The 10-year average yield is 12.4 bushels. North Dakota alone produced 71 per cent of the Nation's crop in 1929 and 79 per cent in 1928. The Dec. 1 farm price for 1929 of 88 cents was some improvement over the low 1928 price of 72 cents, whereas the value of the durum wheat crop declined from $70,000,000 in 1928 to only $46,000,000 in 1929.

Other Spring Wheat.—The production of spring wheat other than durum decreased 26 per cent from 1928, whereas the value was only 18 per cent less. Production in 1929 was estimated at 176,000,000 bushels compared with 239,000,000 in 1928 and a 5-year average of 200,000,000. The acreage harvested in 1929 of 15,664,000 bushels was a slight increase over the 15,223,000 acres in 1928. The average yield per acre dropped from 15.7 bushels in 1928 to 11.2 bushels in 1929, which is also below the 10-year average of 12.6 bushels. On the basis of Dec. 1 farm price of 102 cents per bushel the 1929 crop is valued at approximately $179,000,000 as compared with 91 cents per bushel and a total value of $218,000,000 for 1928.

CORN

Crop Conditions.—The corn crop of 1929 made a very late, poor start in May and early June because of excessive rainfall in many of the important Central States. Favorable weather late in June brought rapid improvement which continued during July throughout the country. In the North Atlantic States and Ohio, however, too much moisture was detrimental, and in North Dakota and Montana heat and drought brought crop prospects down sharply. During August corn prospects declined sharply in practically all parts of the country, due to the unusually dry conditions which developed. In September a large part of the areas which had been suffering from drought received more than normal rainfall, frosts did little damage and most of the Central States had good weather for maturing the crop. October weather was much more favorable than usual for late crops which escaped the September frosts. The final outturn of the corn crop was several per cent higher than was expected in September or early October.

Production.—The production of corn for all purposes in 1929 was about 2,622,000,000 bushels which is about 7 per cent less than the 1928 crop of 2,819,000,000 and 4.6 per cent less than the 5-year average production of 2,747,000,000 bushels for 1923-1927. The total acreage of corn in 1929 was 98,018,000 acres, 2.6 per cent less than in 1928, and 2.8 per cent less than the average acreage from 1923 to 1927. The 1929 yield of 26.8 bushels per acre was 4.3 per cent below the 1928 yield of 28 bushels and 3.6 per cent below the ten-year average yield of 27.8 bushels. The Dec. 1 farm price of corn (for grain) was given as 78 cents per bushel, as compared with 75 cents per bushel Dec. 1, 1928. While the value of the corn crop depends upon the average farm price during the crop year beginning Nov. 1, a rough index of value is obtained by applying the Dec. 1 farm price to the total production. Computed in this manner, the farm value of the 1929 crop is $2,048,000,000, which is about 3 per cent less than the value of the 1928 crop. There is considerable shift in the distribution of the 1929 corn crop as compared with 1928. The 1929 crop in the East North Central States was 14 per cent smaller than in 1928, in the West North Central States 8.4 per cent smaller. In the North Atlantic States, production was about 6 per cent below 1928. In the Southern States, production was 4.7 per cent greater than in 1928; in the Western States 9 per cent greater.

Quality and Carry-Over.—About 80 per cent of the 1929 crop was reported as of merchantable quality as compared with 83 per cent a year ago and a 10-year average of about 81 per cent. The carry-over of old corn on farms, as estimated Nov. 1 was approximately 77,000,000 bushels as compared with 54,000,000 bushels the year before when carry-over was exceptionally low.

OATS AND BARLEY

Oats.—The 1929 crop was about 1,239,000,000 bushels, a decrease of about 200,000,000 bushels from 1928, and of about 106,000,000 from the average crop of 1923-1927. This was due partly to the smaller per acre yield of 30.8 bushels compared with 34.5 bushels last year, and partly to a decrease of about 1,500,000 acres from 1928. The 1929 harvested acreage was 40,217,000 acres, as compared with 41,734,000 acres in 1928. The average Dec. 1 farm price of oats was 43.5 cents per bushel against 40.9 cents in 1928, giving an indicated total farm value for the harvested crop of $538,000,000 compared with $589,000,000 in 1928.

Barley.—The production of barley in 1929 of 307,000,000 bushels was less than the 357,000,000-bushel crop of 1928 but much larger than the 5-year average of 209,000,000 bushels. The increase in the barley acreage from 1928 to 1929 was considerably less than the large increases shown for recent years. In 1927 there were 9,476,000 acres harvested, last year 12,598,000 acres, and in 1929 13,212,000 acres. Yields of barley averaged only 23.2 bushels per acre in 1929 against 28.4 bushels one year ago, this reduced yield accounting for the lower production in spite of the increased acreage. Farm prices for barley Dec. 1, 1929, averaged 55 cents per bushel, or practically the same as last year. Total indicated values of the barley crops were $168,807,000 in 1929 and $197,459,000 in 1928.

OTHER GRAINS

Rye.—Rye production amounted to 41,000,000 bushels in 1929, compared with 43,000,000 bushels in 1928 and 55,000,000 bushels, the 5-year average. The rye acreage for grain in 1929 decreased a little over 7 per cent from 1928. Yields of rye were about the same as 1928, 12.6 bushels per acre. Dec. 1 farm prices averaged 87 cents in 1929 and 86 cents last year, indicating a total farm value of about $35,000,000 in 1929 and $37,000,000 in 1928.

Buckwheat.—Production was placed at about 12,000,000 bushels in 1929, 13,000,000 in 1928 and 14,000,000 bushels, the 5-year average. The acreage dropped about 3 per cent from 749,000 in 1928 to 729,000 acres in 1929. Yields averaged 15.8 bushels in 1929, or about 10 per cent less than the 1928 average of 17.6 bushels. Farm prices as of Dec. 1 averaged 98 cents per bushel in 1929 and 88 cents in 1928, giving total values of about $11,241,000 this year and $11,511,000 last year.

Flaxseed.—Production was estimated as about 17,000,000 bushels compared with 20,000,000 bushels in 1928 and the 5-year average of 23,000,000 bushels. The acreage harvested was increased more than 12 per cent over 1928, but drouth in some states resulted in yields averaging only 5.6 bushels per acre against 7.4 bushels. Farm prices averaged $2.84 Dec. 1, 1929, and $2.01 a year ago, indicating a total farm value for 1929 of $47,871,000 compared with $40,098,000 for 1928.

Rice.—Production was estimated as about 40,000,000 bushels compared with 43,000,000 in 1928 and the 5-year average of 37,000,000 bushels. The acreage harvested dropped from 977,000 in 1928 to 893,000 acres in 1929, a decrease of almost 9 per cent. Yields, however, averaged slightly higher, 45 bushels against 44.3 bushels in 1928. The indicated total farm value of rice was $39,346,000 in 1929 and $38,277,000 in 1928, on the basis of an average farm price of 98 cents per bushel Dec. 1, 1929, and 88 cents Dec. 1, 1928.

Grain Sorghums.—Production of grain sorghums for all purposes was estimated as equivalent to 100,845,000 bushels of grain compared with an equivalent of 142,513,000 bushels produced in 1928 and 122,895,000 bushels the preceding 5-year average. Declines of about 9 per cent in acreage and 22 per cent in yield per acre compared with 1928 have contributed to the sharp decrease in production. The Dec. 1 farm price for grain was 71 cents compared with 62 cents a year ago. The total farm value, based on Dec. 1 prices for grain, is estimated at $71,617,000 compared with $88,429,000 in 1928.

FARM PRICES OF GRAINS AND COTTON

Index Numbers.—The monthly index number of farm prices of grains for Nov. 15, 1929, was 118 per cent of the pre-war average (August, 1909, to July, 1914) of 100 per cent as compared with 110 per cent for November, 1928, and 120 per cent for November, 1927. During 1929 the average of grain prices reached the low point in May and June, whereas in 1928 the high point of the year was reached in the same two months. Grain prices advanced from their early summer low

GRAIN AND COTTON CROPS IN THE U. S.

(Million bushels)

Crops	1929	1928	Five-Year Average, 1923-1927
Corn [1]	2,622	2,819	2,747
All Wheat	807	915	810
Winter Wheat	578	579	549
Durum Wheat [2]	52	97	60
Other Spring	176	239	200
Oats	1,239	1,439	1,345
Barley	307	357	209
Grain Sorghums	101	143	123
Rye	41	43	55
Rice	40	43	37
Flaxseed	17	20	23
Buckwheat	12	13	14
Cotton lint (1,000 bales)	14,919	14,478	14,161
Cottonseed (1,000 tons)	6,630	6,435	6,289

[1] Includes corn for all purposes; the yield per acre represents a grain equivalent applied to all corn and in some states is less than the yield for grain.

[2] Four States—North Dakota, South Dakota, Minnesota and Montana only.

point of 111 in June to 131 in September, dropping since to 128 in October and 118 by Nov. 15, 1929. Farm prices of wheat, rye, corn and flax made sharp advances from June to September, only to decline somewhat by November, while oats and barley made only slight gains after June. The farm price of flax in response to decrease in production, made the greatest advance of any grain during the year, starting with 117 in November, 1928, rising to a spring high of 130 in March, dropping slightly to 127 in May and 128 in June, and advancing rapidly to 178 in October, and declining to 169 in November. The farm price of corn reached a high of 138 in March and a second high of 151 in September, dropping to 126 by November. Rye prices moved much more closely with wheat prices after early summer than during winter and spring. Although the production of oats and barley was materially less than in 1928, the farm prices of these two grains showed little inclination to rise after the low of June, oats not rising above 112 and barley failed to go above 90.

Cotton.—The index of the farm prices of cotton moved within a narrow range between 144 and 152, from November, 1928, until September, 1929. It dropped to 141 in October and 131 in November. The high point of the year was reached in March, 1929.

LIVESTOCK AND MEATS

By E. W. Sheets

Chief, Animal Husbandry Division, Department of Agriculture

CATTLE

Factors in Livestock Retrenchment.—Because 1929 was a less productive crop year than 1928, and also because of pasture and range grass shortages caused by unfavorable weather conditions, the term "retrenchment" sums up fairly accurately the livestock situation as the year draws to a close. The poorer corn prospect apparently influenced cattle feeders to reduce their operations somewhat as compared with a year ago. The lower level of fat cattle prices this year and smaller feeding profits during the first half of the year have tended to slow up cattle feeding operations. The number of cattle and calves shipped from markets into the Corn Belt during the three months, July through September, was 20 per cent smaller this summer than last. It was the second smallest movement of feeder cattle for that period in 12 years.

Slaughter Statistics.—While the estimated number of cattle and calves changed but little during 1928, some increase was expected for 1929. Inspected slaughter of cattle during the first seven months of 1929 was 3 per cent less than in the corresponding months of 1928, 13.4 per cent less than in 1927, and 17.1 per cent less than in 1926. Calf slaughter in the same months decreased 5.4 per cent from that in 1928, and 12.7 per cent from that in 1926. The decrease in cattle slaughtered as compared with a year earlier was entirely in cows and heifers. For the six months, January to June, steer slaughter showed a slight increase over the first half of 1928.

Cattle Prices.—The Bureau of Agricultural Economics estimates that although some decline from the present high level of cattle prices is to be expected within the next three years, there seems little possibility that this decline will carry prices to the low levels which prevailed from 1921 to 1926.

SHEEP AND LAMBS

Feeding.—Indications are that there are about as many sheep and lambs being fed this fall as a year ago. It appears that the eastern Corn Belt is feeding more, Colorado and western Nebraska as many, and the Pacific Northwest decidedly fewer than last year. The premium on ewe lambs that has prevailed for some years was largely lacking this year, a fact which is not without significance as related to the general trend of sheep production. The lamb crop of 1929 was about 1 per cent, or 250,000 head, smaller than that of 1928, but about 7 per cent larger than the 1927 crop.

Wool.—Production of wool in the United States has shown a material increase during the last seven years. While the 302,000,000 pounds of wool shorn in 1929 was only 1 per cent, or 3,000,000 pounds, above the 1928 crop, it was about 20,000,000 pounds above 1927 and approximately 80,000,000 pounds or 36 per cent above 1922, the last low point in United States production. The small increase in wool shorn this year was due to the lighter average weight of fleeces. The number of sheep shorn was 4 per cent larger than in 1928.

PIGS

Decrease in Raising.—The June, 1929, pig survey by the Department showed a decrease in the spring pig crop this year as compared to last. For the United States as a whole this decrease amounted to about 8 per cent and for the 11 Corn Belt States, from which comes most of the market supply of hogs, the decrease amounts to about 6 per cent. The decreases in all areas outside the Corn Belt were larger than those in that region, and were particularly large in the Southern States. The decrease in the North Atlantic States as a group was 15 per cent; in the South Atlantic, 15 per cent; in the South Central, 20 per cent; and Far Western, 6 per cent. The decrease in the number of sows that farrowed this past spring was a little more than the decrease in pigs saved, amounting to about 10 per cent for the whole country and 8 per cent for the Corn Belt States. The number of pigs saved per litter was a little larger this spring than last, which tended to offset in part the decrease in sows farrowed. The June survey also secured information on the number of sows bred or to be bred for fall farrowing. The indications from these point to some increase in fall farrowing in the Corn Belt States, which will be more than offset by decreases elsewhere.

POULTRY

Flocks Increase.—The poultry flocks of the country appear to be somewhat on the increase. The annual fall inventory, based on reports from 20,000 farm flocks, reveals an increase of about 10 per cent in pullets this year. The total number of laying birds is still slightly less than last year but the increase in pullets will probably bring the laying stock this winter up to a point in excess of last year's numbers.

Market and Supply.—The poultry markets were featured by considerably heavier supplies and lower prices than a year ago. Marketings of practically all classes of poultry, with the exception of fowl, were markedly heavy during the fall. Supplies in the warehouses on October 1 amounted to 61,969,000 pounds, which was 18,000,000 pounds larger than a year earlier, and about the same amount in excess of the 5-year average for October 1.

Eggs.—Contrasted with this, however, holdings of eggs in storage on October 1 amounted to 7,191,000 cases, as compared to 8,542,000 on October 1, 1928, and a 5-year average of 8,114,000 cases.

Turkeys.—Another poultry item of interest was the larger turkey crop, indicating an increase of about 9 per cent over last year. About 52 per cent of this crop was ready for the Thanksgiving market, 38 per cent for Christmas, and 10 per cent for later marketing.

Poultry Prices.—Prices of practically all classes of poultry averaged several cents per pound below those of a year ago, and to a considerable extent this reduction was reflected in retail prices.

HORSES AND MULES

While there has been a continued decrease in the horse and mule population of the United States for a number of years, accompanied by a decrease in the number of stallions and jacks licensed for public service in the 24 states having enrollment laws, the indications are that the work stock cycle has turned upward. Draft horses with size and quality are in strong demand at good prices, and the demand for saddle horses is nationwide. Saddle horses and polo mounts are bringing higher prices now than at any time in history. One healthy factor in the horse and mule situation is that decreases in numbers have been taking place at the expense of grade, scrub and mongrel sires. More than 80 per cent of all stallions licensed are pure-bred, while more than 60 per cent of the jacks enrolled are in this class.

MEAT PRODUCTS

Gain in Imports.—Records of the Federal meat-inspection service show that a material increase in meat imports into the United States occurred during the fiscal year ended June 30, 1929. Those of cured and canned meats were more than 26,000,000 greater than during the previous year, most of the increase being represented by the canned product. Imports of fresh beef likewise showed an increase amounting to approximately 16,000,000 pounds. These increases in receipts are apparently largely the result of an attractive price level in the United States. Since this country has not imported meat to any material extent in recent years, the increase in receipts is noteworthy.

RESEARCH AND EXPERIMENT

Quality of product, whether it be meat, wool, mohair, or eggs, continued to be the keynote of research in animal and poultry husbandry. Twenty-one state experiment stations, the Institute of American Meat Packers and the National Live Stock and Meat Board completed the fourth year of their study of the factors responsible for quality in meats with some significant results. An example is a comparison of beef from calves of improved and unimproved breeding. Forty pairs of ribs were studied by means of various chemical, histological and mechanical laboratory tests, succeeded by cooking and eating tests. Although the market grade of the purebred cattle ranked as high as "top good" and that of the plain steers as low as "top common," there was no marked difference in the palatability of their meat. All the cattle were young, averaging from about 12 to 14 months of age. The significance of these data lies in the fact that a livestock breeder desiring to grade up an existing herd of common cattle to the point where he may enjoy the increased profits of improved stock will normally produce a number of rather low-grade calves. An appreciation of the tenderness and general eating qualities of the beef of these young, plain cattle indicates a system of management that will send the commoner ones to market at an age when their beef, though rather lean and unattractive, can be used readily and satisfactorily by the consumer trade.

THE DAIRY INDUSTRY

By A. B. Nystrom

Senior Dairy Husbandman, Department of Agriculture

Milk and Butter.—Little change has taken place in the dairy industry of the United States during 1929. In general, milk production has kept pace with demand. The high price of beef on the one hand and the high cost of raising calves in fluid-milk areas on the other have been factors tending to prevent more than a moderate expansion. In the butter-producing areas, because of favorable pasture conditions, production in the spring was heavier than in late summer and fall. Storage of butter was highest on record on September 1. Since that time out-of-storage movements have been heavy. Prices of butter remained comparatively high throughout the year, averaging about 46 cents per pound for the best grade.

Condensed and evaporated milk production was slightly higher than last year and consequently was greater than that required to meet the demand. This has resulted in a reduction in price as well as in an increase in stocks.

Dry milk and ice cream continued their increase in production which began some 10 years ago. From 25 million pounds of dry milk in 1918, the production reached a total of 155,000,000 pounds in 1928. Besides being used for baking and in ice cream and confections, dry skim milk is now being used in raising calves. Experienced dairymen know that purchased cows rarely are as good producers as those which they can raise from their best cows. In whole-milk areas, therefore, dairymen are raising calves by the use of dry skim milk.

Cheese.—The trend of production of cheese has been downward. The great demand for fluid milk and cream was probably responsible for this. Apparently the consumption of cheese is decreasing. The 1929 production was about 14 per cent lighter than that of 1928. In spite of this drop, storage stocks on November 1 were heavier than a year ago.

DAIRY-HERD IMPROVEMENT

Number and Production of Cows.—A steady increase in production per cow has taken place during the past several years. The estimated annual milk yield for 1917 is 3716 pounds containing about 150 pounds butterfat. For 1928 the estimate is 4600 pounds milk containing 180 pounds butterfat. The number of dairy cows decreased slightly during that period, the estimated number in 1929 being 21,820,000 head as compared with 22,894,000 in 1917. This decrease in numbers is due probably to the selling of heifers for beef purposes, the price of which has been comparatively high in late years. Notwithstanding the decrease in number of cows, the increase in production has been sufficient to take care of both increased consumption per capita and increased population.

Registered Cattle.—Various influences are at work to increase production per cow. All the national dairy breed associations have played a part in this increase. Through their efforts, the use of registered bulls from high producers has been extended to a large per cent of the grade dairy herds of the country. Registered cattle are on the increase, the total registration for 1928 being 12 per cent higher than for 1927 and 22 per cent higher than for 1922.

Cooperative Testing.—Dairy-herd improvement through coöperative testing has likewise had its influence. The average annual production per cow of all dairy-herd improvement association cows whose records were tabulated in 1928 was 7464 pounds milk containing 295 pounds butterfat, whereas in 1920 it was 5989 pounds milk containing 247 pounds butterfat. One of the important developments during the year was the increase in the number of cows on test in dairy-herd improvement associations. On January 1, 1929 there were 465,804 cows on test in 1090 associations. The fact that dairy herds can be quickly improved through the use of proved sires has created an added interest in this work. A dairy sire is proved by comparing the records of 5 or more of his daughters with the records of the dams of the daughters. So far 700 dairy sires have been proved in this way.

RESEARCH

Nutrition and Breeding.—Investigations affecting dairy-cow nutrition, dairy-cattle breeding, and quality of dairy products have been carried on by public institutions, such as state experiment stations and the Department of Agriculture, as well as by private organizations.

By-products.—Much work has been done to develop more efficient ways of using dairy by-products. An achievement along this line worthy of note is the discovery of a practical and economical method of recovering milk sugar from suitably refined syrup in a form that is much sweeter and more quickly soluble than ordinary milk sugar, and at the same time entirely suitable for all purposes for which milk sugar is used in industry.

DAIRY PLANT CONSOLIDATIONS

The merging of small dairy plants into large organizations has continued. During the year the Carnation Farm Products Company, a subsidiary of the Carnation Milk Products Company of Seattle took over 10 of the leading dairies of Portland, Ore., which handled 38 per cent of the city milk supply. The Seattle unit of this company is an outstanding example as it also took over five milk plants and one ice cream factory at Seattle, besides the Carnation farm at Carnation, Wash.

Some 30 smaller concerns, including market-milk plants, creameries, cheese factories, and importing houses, were absorbed by the Borden Company of New York early in the year. The Southwest Dairy Products Company of Houston, Texas, is a merger of 5 small plants in that section. Twelve dairy concerns have recently merged into the United Milk Products Corporation with a capital of $25,000,000. Another important merger which involved products other than dairy products was that formed from the combination of Kraft-Phenix Cheese, Hershey Chocolate, and Colgate-Palmolive-Peet.

DAIRY EXPOSITIONS

Increased interest in dairy exhibitions was manifested at all agricultural fairs held in dairy districts, especially at the larger shows such as the Eastern States Exposition, held at Springfield, Mass., Sept. 15 to 21; the Waterloo Dairy Congress, Waterloo, Iowa, Sept. 30 to Oct. 6; the National Dairy Exposition, St. Louis, Oct. 12 to 20; the Pacific International Livestock Show, Portland, Ore., Oct. 26 to Nov. 2; and the Pacific Slope Dairy Show, Oakland, Calif., Nov. 18 to 23.

At the National Dairy Exposition held this year for the first time in St. Louis, the cattle entries were by far the largest in the history of the association. They included 500 Jerseys, 350 Holsteins, 275 Guernseys, 150 Brown Swiss, and 100 Ayrshires. In addition 150 4-H Club calves, dairy-herd improvement association cows, and animals in special exhibits were entered. In all there were over 1500 head. Contests in judging dairy cattle were held between teams from 28 State colleges, 30 vocational agricultural high schools, and a boys' and girls' club team from each of 27 states. Each team was composed of 3 members. A splendid new plant consisting of arena and barns was built to make St. Louis the permanent home of the exposition. The 1929 show was the most successful of any the association had experienced. Over 250,000 people were in attendance.

DISEASES AND PESTS OF ANIMALS

By John R. Mohler

Chief, Bureau of Animal Industry, Department of Agriculture

Livestock Health.—The general state of health of livestock in the United States during 1929 was more satisfactory than during any previous year of record. Post-mortem examinations of more than 73,000,000 food animals showed that less than 2 per cent were affected by disease to a degree requiring condemnation of the carcasses in whole or in part. Even this small per cent of loss, however, represents a large total when applied to large numbers of livestock, nor does it include the toll which diseases and pests take among farm animals that fail to reach marketable age.

Maladies and Treatment.—However, the year 1929 witnessed material progress against several important livestock maladies and also in a higher appreciation among stock owners of sanitation as a practical disease-control measure. Two foreign livestock maladies, foot-and-mouth disease and European fowl pest, gained temporary entrance into the United States during the year, but both diseases were eradicated promptly by public officials and livestock owners, working coöperatively.

Measures Against Tuberculosis.—Among the important infectious diseases now affecting livestock in the United States, tuberculosis, hog cholera, and tick fever continue to be the objects of intensive campaigns of suppression. The effectiveness of coöperative measures conducted by Federal, state and local authorities to eradicate tuberculosis is definitely shown by a gradually declining percentage of tuberculous cattle and swine. The tuberculin testing of cattle, which is the basis of eradication work, has been proceding at the rate of nearly a million tests a month. Nov. 1, 1929, bovine tuberculosis had been practically eradicated from 833 counties and the work was progressing in 425 other counties. Thus considerably more than one-third of the 3073 counties in the entire United States have either completed or are actively engaged in eradicating tuberculosis from the cattle within their borders.

Hog Cholera.—Outbreaks of hog cholera reported from all sources during the year numbered about 7000. This rather large number is less, however, than the average of recent years, indicating that hog cholera is being kept under reasonably effective control. Outbreaks generally are the result of failure by swine owners to administer the preventive-serum treatment in time or to observe sanitary precautions which help to keep infection from their premises. A corps of trained Federal veterinarians has continued to coöperate with state and local authorities in investigating outbreaks, supervising the cleaning and disinfecting of premises, and in conducting educational work among swine owners and veterinarians.

Swine Parasites.—The inroads of swine parasites, particularly the injurious roundworm, are being prevented effectively by a system of swine sanitation developed by research. This system is being widely used in important swine-growing areas and is materially reducing losses formerly sustained.

Tick Fever.—In the parts of the South still under Federal quarantine because of tick fever among cattle, systematic dipping is gradually reclaiming additional territory from the domain of cattle ticks. In areas recently freed from this pest improved herds of cattle are being developed, which in turn have resulted in the establishment of better local markets for meat and dairy products. Thus the eradication of cattle ticks is adding materially to the livestock and industrial resources of the South.

Disease and Pest Studies.—Continued progress has occurred likewise in the suppression of other animal diseases and in the development of means for combating them most effectively. Many states and other research institutions are coöperating actively with the Federal Government in investigations to determine the extent and causes of losses from animal diseases and pests in various parts of the country. Current studies are aimed particularly at the development of improved means for combating infectious abortion of cattle, pullorum disease of domestic fowls, and various parasitic diseases of economic importance. The reduction of losses through research and veterinary control is proving to be an important means of reducing costs in livestock production. This in turn tends to result in a liberal supply of wholesome animal products at moderate cost to consumers.

INSECT PESTS

By J. A. Hyslop

Bureau of Entomology, Department of Agriculture

Mediterranean Fruit Fly.—The most important entomological feature of wide interest during the past season was the discovery of the Mediterranean fruit fly (*Ceratitis capitata* Wied.) well established in a considerable district in central Florida. On April 6 the first specimens were discovered at Orlando and by the end of June the infested territory was known to extend in a diagonal belt across the state from St. Johns County and Brevard County on the east coast to Hillsboro and Pinellas Counties on the Gulf coast. From that period on, but little further infestation was discovered. An intensive eradication campaign was started promptly. During the latter half of the summer and up to Jan. 1 but one infested fruit was found throughout the entire known infested territory.

Grasshoppers.—During the late summer grasshoppers (*Acrididæ*) became quite generally destructive over the greater part of the East Central, West Central, and North Central States, rather heavy damage occurring in scattered localities throughout the region of the Rocky Mountains and the Great Basin, and by the end of the season outbreaks had developed in the districts of North Dakota and Montana which are a part of the Great Plains.

May Beetles.—Although defoliation by May beetles, the adults of white grubs (*phyllophaga* spp.), was reported from practically all of the upper Mississippi Valley and the North Central States, the grubs themselves did little damage during the year.

Wireworms (*Elateridæ*) attracted considerable attention throughout practically the entire United States. In one place in Idaho, these insects occasioned a loss of $125 per acre in the potato crop.

Cutworms.—During June a large area extending over southeastern South Dakota, southwestern Minnesota, and northeastern Iowa reported very serious depredations by cutworms (*Noctuidæ*).

The velvet bean caterpillar (*Anticarsia gemmatilis* Hbn.) appeared in destructive numbers in the entire Gulf region from Florida to Texas, where it was most conspicuous in destroying soy beans.

Hessian Fly (*Phytophaga destructor* Say) occasioned generally light damage throughout the entire wheat belt with the exception of southern Illinois, Indiana, and two comparatively small districts in central Kansas. Fall infestations are heavy in early-sown grain in these latter districts and also in northern Kentucky, central Tennessee, and all of Missouri.

The chinch bug (*Blissus leucopterus* Say) remains at a comparatively low ebb and, except for limited areas in Georgia and North Carolina, there was practically no trouble.

European Corn Borer.—The spread of the European corn borer (*Pyrausta nubilalis* Hbn.) was generally southward and about what might be considered normal in extent being between 20 and 30 miles. Damage as a whole throughout the entire infested territory was not very severe, although in Ohio and Michigan yields were estimated as having been cut from 10 to 30 per cent in some places.

Japanese Beetle.—Damage by the Japanese beetle (*Popillia japonica* Newm.) in the heavily infested area in 1929 was about the same as in 1928. The most striking feature of the year has been the continued reduction in beetle populations in the central portion of the infested area, as a result of extensive community control campaigns.

Codling Moth.—Very considerable injury by the second-brood larvæ of the codling moth (*Carpocapsa pomonella* L.) occurred over the East Central States. A partial third brood in conjunction with a short crop made side-worm injury very conspicuous over this region and the Middle Atlantic States.

The oriental fruit moth (*Laspeyresia molesta* Busck) was generally destructive over the greater part of the known infested territory. Late in the summer very severe injury was observed in the lower Hudson River Valley in New York State southward to South Carolina and northern Georgia. This insect was recorded for the first time in the State of Massachusetts.

Plum Curculio.—The heaviest infestation by the plum curculio (*Conotrachelus nenuphar* Hbst.) since 1921 was reported from Georgia this year. Generally serious infestations extended up the Atlantic seaboard to New England and westward into the East Central States. Rather bad infestations were also reported from the lower Mississippi Valley.

Mexican Bean Beetle.—Winter survival of the Mexican bean beetle (*Epilachna corrupta* Muls.) in the Southern States was higher during the past year than in any previous year. General control practices were necessary throughout a greater part of the infested territory. The chief spread occurred from New York to Connecticut and into the southwestern corner of Massachusetts. In the Carolinas it spread to the southward. The spread to the west was slight.

The vegetable weevil (*Listroderes obliquus* Gyll.) has continued to spread during the past season. Twenty-eight new counties in four of the Gulf Coast States having been added to the known infested territory. It is now known to be infesting 85 counties in the States of Mississippi, Alabama, Louisiana, and Florida.

Periodical Cicada.—Brood III of the periodical cicada (*Tibicina septendecim* L.) appeared over practically all of the previously known infested territory in Iowa, Missouri, and Illinois. It was recorded from a single locality in Ohio and another in West Virginia.

Bark beetles (*Dendroctonus* spp.) were very destructive over a wide range of territory in the Rocky Mountains and Pacific coast regions, with more or less serious outbreaks scattered in the Gulf coast and lower Appalachian regions.

MARKETING

By A. W. McKay

Senior Agricultural Economist, U. S. Department of Agriculture

FEDERAL FARM BOARD

Organization.—The high light in the marketing of agricultural products in 1929 was the enactment of the Agricultural Marketing Act creating the Federal Farm Board. After almost eight years of debate and controversy over "farm relief," an act admittedly a compromise between conflicting views, was signed by the President June 15, 1929. Less than a month later, seven of the eight appointed members of the Board were selected. The Board held its first meeting on July 15.

Powers of the Board.—The provisions of the Agricultural Marketing Act are discussed elsewhere in this volume. Under its terms the Federal Farm Board is given broad powers to further the marketing of farm products, and a revolving fund of $500,000,000 is set up to enable the Board to extend financial assistance to farmers' coöperative associations. The Board early announced that its efforts would be directed toward strengthening and expanding the coöperative movement.

FARMERS' COOPERATIVE ASSOCIATIONS

Scope and Purposes.—At the time the Board was organized farmers' coöperative associations in the United States numbered approximately 12,500. Their annual volume of business for the past four or five years has averaged about $2,500,000,000. Although there are some 200 "large-scale" associations, the greater part of the coöperatives are small, community organizations. Some of these are members of marketing federations; many others have no affiliation with other groups. The chief problem in coöperative marketing at the present time is that of coördinating the activities of coöperatives handling the same commodity, and filling in the gaps in this structure to create a more compact and stronger coöperative system.

Financing.—Carrying out the provisions of the Agricultural Marketing Act, the Federal Farm Board has made loans to coöperative associations to enable them to acquire physical facilities, to provide working capital, and to enable them to advance to their members a larger percentage of the market value of their products than would otherwise be possible. The total of such loans approved up to December was, according to official statements, in excess of 53 million dollars.

NATIONAL MARKETING AGENCIES

Farmers National Grain Corporation.—The Board has also been active in assisting in the organization of national coöperative marketing agencies. Organization of the Farmers' National Grain Corporation was completed in October. The members of this organization are farmers' elevators, wheat marketing associations, and coöperative grain marketing agencies in the terminal markets. The plan contemplates that as a rule these farmers' organizations will become members of the Farmers' National Grain Corporation in regional groups. By December, two regional associations had been formed—in the Pacific Northwest and the Spring Wheat Area (Montana, North Dakota, South Dakota, and Minnesota).

Wool and Livestock.—A national marketing organization representing the wool marketing associations had also been set up by the end of the year. Progress had also been made in coördinating the work of the livestock marketing associations.

Cotton.—In December, a meeting of representatives of the cotton marketing associations was held and steps were taken to form a central marketing agency.

Fruit and Vegetables.—A preliminary meeting of representatives of certain fruit and vegetable coöperatives was also to be held early in January, 1930.

MARKETING PROBLEMS

Research Service.—The setting up of gigantic coöperatives naturally creates many marketing, financing, and administrative problems. To assist in meeting problems of this kind, the Division of Coöperative Marketing was transferred by executive order from the United States Department of Agriculture to the Federal Farm Board. The transfer became effective Oct. 1. The Board has indicated that it will draw extensively on the facilities of the Department of Agriculture and the agricultural colleges for assistance in research and service work. It will assist in extending these facilities whenever the need for such extension is apparent.

Educational Work.—It is realized also that extending information regarding coöperative marketing and the program of the Federal Farm Board to the farmers, constitutes an important problem. It seems evident that an expanded program of educational work will be developed jointly by the Board, state and Federal extension services, and other educational agencies. Additional funds have been requested from Congress for the purpose of increasing the work of the extension agencies in agricultural economics.

MARKETING CONDITIONS

Effect of Stock Market Crash.—The marketing of agricultural products during 1929 has met with some unexpected obstacles. The most important of these has been the effect of the crash in the securities markets upon the prices of grain, cotton, butter, and other agricultural products. The important wheat and cotton crops, despite an apparently favorable technical position, have remained at low levels during the harvesting season. Considerable improvement in the wheat situation was experienced during December, due to accumulating evidence that world supplies of wheat for the current season are approximately 350 million bushels below the 1928-29 crop.

Commodity Prices.—Cotton prices, however, have been generally below those of last year, despite the decreased world supply. An unusual surplus of butter has accumulated during the fall months, resulting in decreased prices. Milk producers also experienced an unusual surplus of fluid milk during the fall months, and net returns consequently have been lower. On the other hand, the situation of the livestock producers has been relatively favorable, although prices generally have been slightly lower than in 1928. Supplies of fruits have been moderate and prices generally favorable. It seems evident that for some fruit and vegetable crops, particularly potatoes, prices have not reached the levels anticipated from the reduced supply. This is attributed by many authorities to the temporary effects of the depression in the securities markets and uncertainty regarding the industrial situation.

HORTICULTURE

By William A. Taylor

Chief, Bureau of Plant Industry, Department of Agriculture

FRUIT CROPS

Apples.—The year 1929 was characterized by light rather than heavy crops of fruit. The total apple crop was estimated to be about 140,000,000 bushels, compared with 185,700,000 bushels in 1928, and an average for the previous five years of 183,450,000 bushels. The commercial crop was equivalent to about 28,500,000 barrels, in contrast to nearly 35,270,000 barrels in 1928, and an average for the five years of 32,468,000 barrels.

Pears and Peaches.—Though the pear crop of about 20,800,000 bushels was some 3,200,000 bushels less than for the previous year, it was about 800,000 bushels more than the five year average for 1923-27. Peach production was relatively less than that of most fruits, the crop being about 44,800,000 bushels (figures not final) compared with the very large crop of 68,000,000 bushels in 1928, and a five year average (1923-27) of 52,000,000 bushels.

Other Fruits.—The yields of most other fruits, including citrus as well as deciduous, were less than those of 1928, and in some cases they were below the five year average for 1923-27. The lower yields in 1929 were due to various factors, including the unusually large crops in 1928, adverse weather conditions in many regions, including the Pacific Coast States, during the blossoming period, and wide-spread and prolonged drought during the summer in several important regions.

MEDITERRANEAN FRUIT FLY

The most striking feature of the year, and as disturbing, was the discovery in Florida in April of the dreaded Mediterranean fruit fly in citrus fruit. This was promptly followed by a very extensive and thorough inspection by state and Federal agencies of all citrus orchards and other host plants in a large area, revealing a serious infestation in many places rather widely separated. With the least possible delay both Federal and State quarantine organizations combined in an intensive campaign with complete eradication of the insect as the objective. While great vigilance and systematic inspection will have to be maintained for a long time, notable and hopeful progress had been made by the end of the year. The development of a method of sterilizing citrus fruits by heat as a safeguard against spread of the pest to other regions in shipments and without material impairment of its edible and market quality is worthy of mention in this connection.

FROZEN FRUITS

In the handling and utilization of fruits the frozen pack, especially of strawberries, has received considerable attention. The fruit is used at soda fountains, in flavoring ice cream, and in other ways. By this method, the fresh fruit is put in barrels with a certain proportion of sugar, and then placed in freezing storage where it is held until desired for use. For the purposes mentioned, the qualities of the product closely approximate those of fresh fruit. This process has been utilized commercially to a considerable extent, but in a wholesale way. The problem of packing in family size containers with a view to delivery direct to the consumer has recently been undertaken on a rather extensive scale.

VEGETABLES

Marglobe Tomato.—Gradually and with little exploitation certain varieties of important vegetables highly resistant to disease and which have been developed recently by breeding are superseding older susceptible sorts. The Marglobe tomato, a result of breeding disease-resistant tomatoes in the United States Department of Agriculture, has now superseded all other varieties in Florida, and largely so on the west coast of Mexico. This variety is resistant to the nailhead disease from which other varieties suffer severely.

Cabbage.—In a similar manner cabbage varieties resistant to the yellows disease have been developed by breeding which have displaced older susceptible sorts to the extent of 40 to 90 per cent in various large production centers in several of the mid-western states.

Broccoli.—In new vegetables, that is, vegetables not previously grown to any considerable extent in this country, branching or Italian broccoli is outstanding in that, from an insignificant beginning a few years ago, it is now being grown in sufficient quantities so that it is shipped to many of the eastern markets.

Winter Vegetables.—The production of winter vegetables in certain sections of the United States and in some of the adjacent tropical or subtropical regions has expanded remarkably in recent years, with increases both in domestic production and in importations during the past year. The principal domestic sources of winter vegetables are the east coast of Florida, the lower Rio Grande Valley in Texas, and the Imperial Valley in California. Importations come from the west coast of Mexico, Cuba, Bermuda and the Bahamas. In the season of 1928-29, Nov. 1 to June 30, they amounted to about 161,000,000 pounds as compared with 125,000,000 pounds in 1925-26. The tomato is the most important crop, an average of more than 110,000,000 pounds per year having been imported during the past three seasons. Most of the tomatoes and green peas imported come from the Mexico west coast. Shipments of peas have increased during the past three seasons, more than 19,000,000 pounds being imported last season. Practically all the green peppers during the winter months come from Mexico and Cuba, and celery from Bermuda. Early potatoes from Cuba and Bermuda are imported to the extent of more than 180,000 bushels per year, averaged for the past three seasons. Lettuce and carrots, also peas, tomatoes and potatoes come from domestic sources.

HORTICULTURAL TRANSPORTATION AND STORAGE

In the transportation of horticultural products better methods of protection against both heat and cold have been devised and given practical tests. It has been demonstrated by specialists in the Department of Agriculture that the rapid precooling of cars of perishable products after loading can be effected by use of a portable and relatively inexpensive motor-driven fans in connection with the ordinary car icing practice. By lowering such equipment through the hatchway and supporting it in the tops of the bunkers filled with ice and certain proportions of salt, the air is forced upward through the ice and out over and through the packed produce with sufficient rapidity to cool down the contents effectively and quickly. Better protection against injury of perishable products due to freezing in transmit may be obtained by the use of improved car heaters, the effective operation of which is being studied in experimental tests.

FORESTRY

By Herbert A. Smith

Assistant Forester, United States Forest Service

FOREST DEPLETION

Standing Timber.—The most authoritative estimate of the annual drain upon our standing timber is still that made by the United States Forest Service in 1922, as follows:

	Cubic Feet
Fuel wood	9,500,000,000
Sawed lumber	8,256,300,000
Other forest products	4,649,200,000
Destroyed by fire, insects, disease, and windfall	2,380,000,000
Total	24,785,500,000

Consumption and Growth.—Other "forest" products comprised fencing (1.8 billion cubic feet), hewed ties (840 million cubic feet), pulp wood (585 million), mine timbers (not quite 396 million) cooperage (not quite 315 million), shingles (198 million), and various lesser items. The estimates for fuel wood and fencing and for losses through fire and other destructive agencies are open to considerable question, since adequate data do not exist. Concerning the rate of growth likewise there is much uncertainty. The 1922 estimate of the Forest Service, still unsuperseded, placed it at less than one-fourth the drain, with a substantially heavier overdraft for sawtimber as distinguished from cordwood.

Better Data Needed.—In July, 1929, a comprehensive survey of timber supplies and requirements, present and future, was inaugurated by the Forest Service. As it advances it will provide a far surer basis for public and private forest policies than is now or has ever yet been available. That the present drain is far out of balance with the rate of growth, and that the resulting depletion affords ground for grave public concern, are beyond question. While increased protection against fire and interest in reforestation are materially augmenting the volume of reproduction, relief from this source is far away.

THE LUMBER INDUSTRY

Production.—The latest statistics of lumber production are for 1928. Even for that year only the preliminary census figures, subject to later correction when final figures are made up, are as yet at hand. The best information available indicates, however, a 1929 cut not far from that of 1928. The general trend of lumber production, and also of lumber consumption, in the United States has been downward for more than 20 years, and pronouncedly so since 1912. In per capita consumption the decline, of course, has been still more pronounced. A peak production of 46 billion board feet in 1906 and 1907 contrasts with less than 27 billion board feet in the distress year 1921, an exceptionally low year. The 1928 lumber cut, 34,142,123,000 board feet, was 1.1 per cent less than that of 1927.

Consumption.—The per capita consumption in 1906 was 525 board feet; in 1928, 270 board feet. In 1928 exports of lumber totaled 3,382,281,000 board feet and imports 1,497,506,000 board feet. The exports were principally to (1) the United Kingdom, (2) Japan, (3) Canada, and (4) Argentina. Of the imports Canada furnished the greater part.

Analysis of Lumber Cut.—The 1928 output of the lumber industry in the United States included also 1,903,859,000 lath, a decrease of 19.7 per cent from the 1927 output, and 5,603,690,000 shingles, a decrease of 13 per cent. Of the 1928 lumber cut Douglas fir and Southern pine together furnished 55.9 per cent. Southern pine alone furnished 31.1 per cent. The cut of Douglas fir, 8,449,282,000 board feet, exceeded that of 1927, while Southern pine with 10,610,290,000 board feet showed a slight decrease. The leading States in 1928 lumber production were Washington, with 7.3 billion board feet; Oregon, with 4.4 billion; Mississippi, with 3.5 billion; Louisiana, with 2.3 billion; Alabama, with a little under 2 billion; and California, with 1.9 billion. These 6 States, therefore, 3 on the Gulf Coast and 3 on the Pacific, produced 60 per cent of the entire cut. The lumber industry continued in 1929 to derive the major part of its cut from virgin timber, which provides a higher percentage of sawlogs and yields a much higher average grade of lumber than the second-growth forests that characterize the older regions. Much of the second-growth forest, indeed, contains little sawtimber and is valuable chiefly for cordwood. Good practices of forestry would prevent this.

FOREST PROTECTION, ADMINISTRATION, AND MANAGEMENT

Fire Protection.—Of the estimated 470,000,000 acres of forest land in the United States 72 per cent received in 1929 organized protection against fire. Protective systems maintained by the Federal Government for its own lands covered 98,000,000 acres of forested land, exclusive of lands in the two national forests of Alaska, and State systems approximately 240,000,000 acres, of which State lands made up 11,000,000 acres and private lands the rest. Additional private lands were protected independently by the owners.

The state systems were coöperatively maintained, the Federal Government contributing in the fiscal year 1929 $1,068,847 and private agencies $922,674 toward meeting their total cost of $4,111,180. To protect adequately all State and private forest lands needing protection would necessitate an estimated expenditure of $10,000,000 annually. The Federal protective systems likewise were inadequately provided for financially.

Administration Expenditures. — Public forest administration embraces National, State, and county forests and parks and town forests. By far the largest public undertaking of forestry in the United States is National Forest administration. The expenditures for the Federal fiscal year 1929 totaled $21,108,507.16, of which the leading item, $11,154,206.85, was for road and trail construction and maintenance. Large additional expenditures for the development of an adequate road system and for other improvements will be necessary.

National Forests.—Federal land in the National Forests June 30, 1929, totaled 159,750,520 acres, 269,664 acres more than one year previously. The area is being increased slowly in the West through exchanges of Government land or timber for other land, and in the East through land purchases. About 78,000,000 acres of the National Forests are not classified as forest land, since they will not grow commercial timber. The non-forest land is made up in part of bare rock, mountain summits above timber line, and the like, but principally of brush and grass lands with or without scattered tree growth, primarily included for watershed protection. Regulated grazing of these lands, and also of much of the forest land, is permitted as a rule. The cash receipts for uses of the National Forests in the fiscal year 1929 were $6,299,801.86, an increase of $858,201.04 over the previous year; timber use contributed $4,108,595, grazing use $1,740,289.81, and miscellaneous uses $450,917.05.

Timber Cutting and Policy.—The cutting of timber on the National Forests is governed by definite plans of forest management, providing for a sustained yield from a given area, or "working circle." Few private owners have as yet adopted this principle, nor is it applied to any considerable extent on state forests. A good many private owners, however, are beginning to inaugurate conservative practices designed to bring about forest perpetuation. Many obstacles impede the spread of private forestry, and the country faces a still unsolved problem of forest land utilization the magnitude of which is almost beyond popular understanding. A significant "statement of forestry policy" adopted by the Board of Directors of the National Lumber Manufacturers in August, 1929, throws some light on the scope of the problem. It is presenting itself also in relation with the agricultural problem of the country. That it will have to be given a large measure of public attention in the near future seems to be evident.

FISHERIES OF THE UNITED STATES AND ALASKA

By Lewis Radcliffe

Deputy Commissioner, U. S. Bureau of Fisheries

COMMERCIAL FISHERIES

Extent and Value.—According to recent statistics, the commercial fisheries of the United States and Alaska are in a sounder position than at any previous time. They now employ nearly 127,000 fishermen, and the annual catch amounts to nearly 3,000,000,000 pounds, valued at about $113,000,000. For transporting these products from the fishing grounds to market or from port to port over 4,000 persons are engaged aboard vessels.

Canned Fishery Products and By-products.—Four hundred and eighty-one establishments were engaged in canning fishery products in 1928, the total production being 15,629,980 standard cases, or 617,327,527 pounds, net weight, valued at $95,871,855, to which may be added $14,880,956, the value of by-products, making a total of $110,752,811. This was an increase of 18 per cent in the value of canned products and 16 per cent in the value of by-products when compared with the respective values of the previous year. Alaska contributed 43 per cent, California 22 per cent, and Maine 9 per cent of the total value. The pack of canned salmon exceeded 332,000,000 pounds; of sardines, 184,000,000 pounds; of tunas, 29,000,000 pounds; of shrimp, 13,850,000 pounds; and clam products, 12,746,000 pounds.

Frozen Fish.—In 1928 there were 155 public freezers and cold-storage warehouses devoted wholly or in part to the storage of frozen and cured fishery products. The average monthly holdings during the past few years have increased, amounting to 53,925,000 pounds in 1928, or 10 per cent more than in 1927 and 22 per cent more than the 5-year average. The quantity of fish frozen, amounting to 113,637,898 pounds, is greater than in any previous year.

Packaged Fresh and Frozen Fish.—Packaged fresh and frozen fish were produced in 85 plants operated in 12 States in 1928. The output was 65,245,376 pounds, valued at $9,790,024. Haddock accounted for 87 per cent of the total quantity prepared. Other species packaged to a considerable extent were cod, squeteague, hake, and croaker. Massachusetts accounted for 65 per cent of the production, and Connecticut and New York also packed important quantities. Of the total production, fillets accounted for 89 per cent; the rest consisted of dressed fish, pan-dressed fish, sticks, steaks, and tenderloins.

FOREIGN FISHERY TRADE

Value.—The value of the United States' foreign trade in fishery products during 1928 amounted to $80,028,683, of which $58,854,938 represents the value of those imported for consumption and $21,173,745 the value of exports of domestic fishery products. Compared with 1927, this is an increase of 8 per cent in the value of the total trade, 6 per cent in imports, and 13 per cent in exports.

Imports consisted of 360,767,010 pounds of edible products (including fresh, frozen, cured, and canned fishery products), valued at $37,391,079, and non-edible products (comprising mainly fish- and marine-animal oils, pearls, and imitation pearls), valued at $21,463,859.

Exports consisted of 170,817,414 pounds of edible products, valued at $20,786,353, and non-edible products valued at $387,392.

VESSEL FISHERIES OF NEW ENGLAND

Record Landings.—In 1928 landings of fish by American vessels at Boston, Gloucester, and Portland, Me., amounted to 277,981,691 pounds, as landed, valued at $10,849,145, and were larger than in any year for which there are records; the value also was greater, due largely to the demand by the filleting trade. Of this amount, over 155,000,000 pounds were haddock.

While Boston, Gloucester, and Portland continue to receive most of the fish brought in by these vessels, larger quantities are being landed at other New England ports, especially at Vinal Haven, Me., and Groton, Conn.

Atlantic Mackerel Fishery.—In 1928 the mackerel fishery resembled that of the previous year, with heavy southern and Block Island runs in the spring, followed by a slack season in the Gulf of Maine during the summer and autumn. An unusual run of large mackerel appeared off Cape Ann and lasted well into December. Altogether, the season's catch, amounting to nearly 31,000,000 pounds, was about 25 per cent below that of the previous year.

SOUTH ATLANTIC STATES

In 1927 the fisheries of North Carolina, South Carolina, Georgia, and the east coast of Florida employed 11,527 fishermen, or 14 per cent more than in 1923. The catch amounted to 260,668,693 pounds, valued at $5,695,887 which is an increase of 14 per cent in quantity and 12 per cent in value when compared with 1923. The fisheries of this region are conducted largely alongshore with small operating units. For this reason the trade is confined chiefly to marketing primary products, except for canned shrimp and oysters. The production of canned shrimp in 1928 showed little change from the previous year, while there was a considerable increase in the production of oysters. The output of menhaden products increased substantially.

GULF STATES

Oysters and Shrimp.—The fisheries of the west coast of Florida, Alabama, Mississippi, Louisiana, and Texas were more productive in 1927 than in any year since 1880. They employed 15,133 fishermen, or 43 per cent more than in 1923, and the catch amounted to 195,705,355 pounds, valued at $9,965,775, which is an increase of 22 per cent in quantity and 23 per cent in value when compared with 1923. This was due chiefly to larger catches of shrimp and oysters. The production of canned shrimp was greater than in the previous year, although the market value did not increase accordingly. The production of canned oysters was about the same as in 1927.

PACIFIC COAST STATES

Record Catch.—In 1927 the fisheries of Washington, Oregon, and California produced 651,196,982 pounds of products valued at $22,306,576, which is an increase of 25 per cent in quantity and 18 per cent in value over 1926, and is the largest catch on record. This was due mainly to larger catches of pilchards, tuna, and tuna-like fishes. There were 20,514 fishermen engaged in making this catch.

Salmon.—In 1928 the pack of salmon was 44 per cent less than in the previous year. This was due to smaller packs of pink and humpback salmon on Puget Sound, 1928 being an off year. Compared with the previous off year, 1926, there was an increase of about 1 per cent.

Sardines.—The pack of sardines was the largest on record both in volume and value. The production of canned tuna was less than in 1927, but the value was greater, being slightly below the highest value on record.

Mackerel.—Unusual developments occurred in the mackerel canning industry of California in 1928, the production being valued at about $1,600,000. In 1927 the production was so small that it was included in the statistics with other canned fish. Now mackerel is finding favor in the export trade with the Philippines.

Halibut. — The halibut fishery, which is prosecuted by American and Canadian vessels, ranks foremost among fisheries of the section. In 1928 the total weight of the catch, as landed, by vessels of both nationalities amounted to 54,915,000 pounds, valued at $5,673,000. This is virtually the same as in 1927, and a little more than for 1925 and 1926, in spite of the depleted condition of the fishery. Of the total landings, 79 per cent was taken by American craft and 21 per cent by Canadian craft.

LAKE STATES

In 1927 the lake fisheries (Ontario, Erie, Huron, Michigan, Superior, and Namakan, Lake of the Woods, and

Rainy Lake) of the United States and Canada produced 111,952,531 pounds of fish. Of the total the United States accounted for 81,326,550 pounds, valued at $6,794,891. This is about the same as in the previous year, although there was a slight decline from the 10-year average. The average is being held up by greater catches of some of the less-favored species, while decreases are apparent in some of the choice species, such as the cisco of Lake Erie, which shows a decline of 81 per cent compared with the 10-year average. Larger catches were made on every lake in 1927 than in 1926 except Ontario, Erie, and the international lakes of Minnesota. The Canadian catch amounted to 30,625,981 pounds, an increase of 11 per cent over the previous year.

ALASKA

Employment and Catch.—In 1928 the fisheries of Alaska employed 31,086 persons—11,519 fishermen, 17,812 employed in the wholesale and manufacturing industries, and 1,755 in transporting fishery products. The catch of fish and shellfish in the round weight, plus the weight of whale products, amounted to 699,006,000 pounds, valued at $17,797,000.

Canned Fish Output.—Of the 288 establishments in Alaska engaged in the fisheries trade, 154 canned fish, 119 cured fish, 36 handled fresh and frozen fishery products, and 27 manufactured by-products. The output of these establishments amounted to 414,183,105 pounds, valued at $54,553,376. The salmon industry was by far the most important and produced 308,691,203 pounds of products, valued at $47,487,763. In value, the halibut industry was next in importance and produced 31,567,000 pounds of products, valued at $3,094,000. The herring industry ranked third in importance and produced 63,047,353 pounds of products, valued at $3,098,457. Of the remainder, whales, shrimp, and clam products were most important in value.

FISHERIES OF THE UNITED STATES AND ALASKA

Sections	Fishermen	Fishing vessels	Fishing boats	Persons on transporters	Transporting vessels	Products	
	Number	Number	Number	Number	Number	Pounds	Value
New England States, 1924	15,007	615	10,022	278	162	406,822,000	$ 18,818,000
Middle Atlantic States, 1926	9,971	617	4,504	89	63	168,012,000	12,456,000
Chesapeake Bay States, 1925	24,793	574	17,021	985	523	333,206,000	13,948,000
South Atlantic States, 1927	11,527	177	7,223	208	115	260,669,000	5,696,000
Gulf States, 1927...	15,353	499	8,801	136	68	200,072,000	10,167,000
Pacific Coast States, 1927	20,514	767	7,786	474	172	651,197,000	22,306,000
Mississippi River States, 1922	12,310	—	15,538	30	13	105,734,000	4,504,000
Lake States, 1927..	5,825	401	2,368	162	103	87,659,000	7,032,000
Alaska, 1928	11,610	583	6,885	1,755	474	699,006,000	17,797,000
Total, various years, 1922-28	126,910	4,233	80,148	4,117	1,693	2,912,377,000	$112,724,000

Note: For the Pacific Coast and Lake States the number of transporters and persons on transporters are for 1922. Statistics of the fisheries of the Gulf States include those for Lake Okeechobee, Fla.

FISHERIES CONSERVATION

Mackerel Investigations.—The principal function of the U. S. Bureau of Fisheries program of biological research is to provide fishery administrators with sound and practical scientific information for the conservation of the fisheries. In the North Atlantic area, data have been obtained concerning the life history and migrations of the cod on Nantucket Shoals, revealing a southward migration to the mouth of Chesapeake Bay. Mackerel investigations have reached the stage where it is possible to predict the probable abundance of mackerel in the following year, for the direct benefit of the industry.

Salmon, Halibut and Herring.—On the Pacific coast and in Alaska, excellent progress is being made in studies of salmon, halibut and herring. Through tagging of the salmon en route to the spawning grounds, the establishment of counting weirs in Alaskan streams to determine the number of fish reaching the spawning beds and by approximating the return of a given year's brood to the parent stream at maturity, the Bureau is determining the important points in the life histories of these fishes as a basis for wise administration.

Water Farming.—Important contributions are being made in the field of practical oyster farming on both coasts, in the development of improved methods of propagating the fresh water mussels of the Mississippi Valley and in developing methods of combatting the enemies of shellfish. Investigations in fish pathology and experimental fish culture aid in increasing the effectiveness of fish hatcheries and the success of water farming.

FISH PROPAGATION

Record Production.—The fish-cultural operations of the U. S. Bureau of Fisheries during the year resulted in a production of fish and eggs exceeding all previous records. There were distributed to applicants or planted in public waters 7,060,369,500 eggs and fish of the more than 40 different species propagated; marine commercial species, including cod, haddock, pollock, and winter flounder comprising 83 per cent of this total. The commercial species of interior waters accounted for 6 per cent, and the commercial anadromous forms such as the shad and Pacific salmons amounted to five per cent. The strictly game forms represented four per cent.

Egg Allotments to States.—The Bureau likewise allotted 74,410,000 eggs to the various States as a form of coöperation in their activities and allotted to foreign governments a total of 3,290,000. The four fish cars utilized in distributing the output traveled a total of 79,646 miles during the year and detached messengers operating from the cars covered approximately 346,279 miles in addition.

The coöperative nursery system whereby fish are turned over to sportsmen's organizations for rearing to larger size rather than planted immediately in the streams has been further expanded. The number of units operating under this plan has been increased from 86 in 1928, utilizing 2,675,000 fish, mostly trout, to 114 in 1929 to which were allotted about 5,000,000 fish and eggs. The feeding of these fish in rearing pools by sportsmen's organizations for a period of 4 to 5 months or longer has permitted the distribution of a large proportion of them at a size of 5 or 6 inches rather than as small fingerlings.

COGNATE SOCIETIES

AMERICAN ASSN. FOR THE ADVANCEMENT OF SCIENCE, Smithsonian Institution, Washington, D. C.

AMERICAN ASSOCIATION OF NURSERYMEN, Louisiana, Mo.

AMERICAN COUNTRY LIFE ASSOCIATION, 375 Lexington Ave., New York City.

AMERICAN FARM BUREAU ASSOCIATION, 58 East Washington St., Chicago, Ill.

AMERICAN FISHERIES SOCIETY, 2273 Woolworth Building, New York City.

AMERICAN FORESTRY ASSOCIATION, 1523 L St., N.W., Washington, D. C.

AMERICAN GAME PROTECTIVE AND PROPAGATION ASSOCIATION, 233 Broadway, New York City, New York.

AMERICAN NATIONAL LIVESTOCK ASSOCIATION, Denver, Colorado.

AMERICAN ORNITHOLOGISTS' UNION, U. S. National Museum, Washington, D. C.

AMERICAN POULTRY ASSOCIATION, Fort Wayne, Indiana.

American Society for Horticultural Science, Geneva, New York, New York.

American Society of Agronomy, Ames, Iowa.

American Society of Animal Production, Lafayette, Indiana.

American Society of Equity, 311 Daily Star Building, Minneapolis, Minn.

American Society of Mammalogists, Johns Hopkins Medical School, Baltimore, Md.

American Veterinary Medical Association, 716 Book Building, Detroit, Michigan.

Association of Land-Grant Colleges and Universities, Newark, Delaware.

Farmers' National Council, Bliss Building, 35 B St., N.W., Washington, D. C.

Farm Women's National Congress, Clarksville, Iowa.

Federated Farm Women of America, 26 Jackson Place, Washington, D. C.

Institute of American Meat Packers, 509 South Wabash Ave., Chicago, Illinois.

International Farm Congress of America, Continental Bldg., Kansas City, Missouri.

Izaak Walton League of America (The), 214 West Huron St., Chicago, Ill.

Jewish Agricultural Society, Inc., 301 East 14th Street, New York City.

Middle Atlantic Fisheries Association, Bridge Arch No. 11, New York City.

National Association of Audubon Societies, Groton, Mass.

National Board of Farm Organizations, 1731-I St., N.W., Washington, D. C.

National Dairy Council, 307 North Michigan Ave., Chicago, Ill.

National Educational and Coöperative Farmers' Union of America, 1731-I St., N.W., Washington, D. C.

National Fertilizer Assn., Investment Building, Washington, D. C.

National Grange of the Patrons of Husbandry, 630 Louisiana Ave., N.W., Washington, D. C.

National Highways Association, 18 Old Slip, New York City.

National Live Stock and Meat Board, Old Colony Bldg., Chicago, Ill.

National Poultry Council, Davisville, Rhode Island.

Society of American Florists and Ornamental Horticulturists, 247 Park Ave., N. Y. C.

Society of American Foresters, 930 F Street, N.W., Washington, D. C.

U. S. Livestock Sanitary Assn., Live Stock Exchange Bldg., Wichita, Kansas.

Vegetable Growers Association of America, c/o F. L. Allen Co., Philadelphia, Pa.

Women's National Farm and Garden Association, 26 East 35th Street, New York City.

DIVISION XII

MINERAL INDUSTRIES

MINING AND ORE DRESSING

By Charles E. Locke

Associate Professor, Massachusetts Institute of Technology

GENERAL CONDITIONS

Late Reaction Follows Prosperity.—Up to the date of the slump in the stock market in the fall, the year 1929 was one of great prosperity in the mining industry but during the last two months reaction occurred in mining in sympathy with the stock market and general business. The character of the year is well shown by the record of shipments by water of iron ore from Lake Superior districts which, in spite of a considerable drop in November, showed a record in a grand total of 65,204,600 long tons (plus about 1,000,000 tons shipped by rail) being an increase of about 20 per cent over the water shipment of 53,980,874 tons in 1928 and a little higher than the previous record of 64,734,198 tons in the war year 1916.

Metal Price Ranges.—Metal prices reflected the general condition as shown by the following price ranges in round numbers. Copper rose from 16½ cents per pound in January to 25 cents in March and was stabilized at 18 cents from May to December. Lead was 6½ cents per pound in January, up to 8 cents in March, and ranging from 6 to 7 cents the rest of the year with a declining tendency at the end. Zinc ranged between 6½ and 7 cents from January to October and dropped to slightly under 6 cents in December. Silver declined gradually throughout the year from 57 cents per ounce in January to 46 cents in December. Quicksilver was $119.00 per flask of 76 pounds in January, $125.00 in September and $122.00 in December. Platinum went from $70.00 per ounce in January to $63.00 in December. Basic pig iron was low at $17.50 per ton in January, but rose to $18.50 and remained at that figure during the last half of the year. Tin sagged steadily from 49 cents per pound in January to 39 cents in December.

The Outlook.—The metal situation at the end of the year was one of increased stocks and curtailed production, but hope was for better times soon after the new year. The basis for this hope lay in the expected demand for metals and improvement in business which should come as a result of the announced policy of the Government and big organizations to embark on large capital expenditures for construction and betterments. Steel plants in December were operating at about 50 per cent of capacity as compared to 85 per cent at the end of 1928, but an increase of at least 15 per cent was looked for in January.

MINING PRODUCTION

Copper.—The attitude of the large producers was to attempt to maintain the price at 18 cents per pound and curtail operations so as to hold production on a par with consumption. There seemed to be a fair chance that this policy might succeed even though there are great copper deposits in Africa that are not under the control of the big organizations of the United States. These African deposits are destined to yield a large supply of fairly cheap copper in the future but, at present, with the exception of Katanga, these properties are in the development and equipment stage which is a slow process so that it will be between five and ten years hence before their production becomes a real factor in the world's output and by that time the annual increase in demand should absorb this extra copper without injuring the older mines.

Zinc and Lead.—The prospect for zinc in the near future did not look so rosy, and the same applied to lead in a lesser degree since the flotation process of ore concentration is bringing a steady stream of these metals from complex ores containing often gold, silver, and copper in addition to the lead and zinc. To the straight zinc miners in the Tri-State district of Missouri, Oklahoma and Kansas the outlook was particularly gloomy.

Manganese.—Producers were still awaiting the action of Congress on the tariff. If foreign manganese ores are admitted free of duty, the domestic manganese production will suffer badly but, if given a satisfactory protective tariff, the home industry will prosper.

Coal.—Some improvement in the coal situation took place so that by closing high cost mines and introducing economics many coal operators were able to make some money.

OIL AND GAS

Natural Gas.—Production of petroleum increased in 1929, but oil and natural gas were in a more satisfactory position than in the past and there is hope that the great loss to oil operators from competitive drilling and over-production and the tremendous waste of natural gas may be gradually eliminated in the future. There are too many producers to effect a satisfactory combination to control production and such a combination would be illegal under the present laws. However, the State of California seems to have found a solution in its law requiring the conservation of natural gas which allows no oil wells to be operated where the accompanying natural gas is wasted. If other oil-producing states will pass a similar law it will go a long way toward benefiting the entire industry. As it was, when a big drop in oil consumption came toward the end of 1929 the big companies closed in many wells and cut production accordingly.

Oil Reserve and Production Curtailment.—There is thus a big developed reserve of oil which is not being drawn upon to its full extent to flood the country and break prices as in the past. If this curtailment policy can be maintained permanently it will be a big step in advance. Another contributing factor to greater prosperity in oil and gas fields is the recent marked development of long distance transmission of natural gas in pipe lines for industrial uses. This has been warranted by the promise that many big fields offer of maintaining a steady flow of gas over a considerable period of years. Already pipe lines from Louisiana, Texas and Oklahoma radiate as far east as Macon, Georgia, and as far west as Salt Lake City, and it is proposed to extend them as far north as Chicago. Wells are being drilled to great depths. One in California is over 9000 feet and still going deeper; Texas has two wells 8500 feet deep and Oklahoma has a number of wells over 6000 feet. One characteristic of these deep wells is that the deeper the well the greater is its output in general.

MINING OPERATIONS

Ore Deposits and the Market.—Mining operations to-day have to deal less with rich deposits of short life which are becoming scarcer, and more with large low-grade deposits. Consequently the mine operator is in the same class as a manufacturer in that he has a large supply of raw material, *i.e.* ore, sufficient to last for many years and his problem is to convert it into a marketable product. Consequently, he is able to plan a large scale plant introducing every possible feature for economy and efficiency. This is especially true in the case of copper where a good profit is being obtained by some mines on ore containing less than one per cent copper, and it is predicted that ore as low as 0.5 per cent copper will be mined in the the near future. Many old refuse piles from earlier operations are being re-treated at a profit.

Mining Technique.—No radical changes have been made, but progress has been made along the line of larger apparatus, more mechanical power replacing hand operations, and general increase in efficiency and economy. In coal particularly machine mining and loading is showing a steady increase. A good example of the use of bigger apparatus is the new shovel being installed by the Northern Pacific Railway Company for open pit mining. This has a boom 120 feet long carrying a dipper arm 90 feet long with a dipper on the end holding 270 cubic feet or 15 tons. It can dump its load at a height of 100 feet or at a distance of 300 feet.

Geophysical prospecting has continued to develop as valuable aid in discovering new ore bodies which lie completely buried so that no evidence of them exists on the surface of the ground. In order that the discoverer may have title to such deposits and in order that money spent in geophysical prospecting may be counted as satisfying the requirements of the Government for the expenditure of a definite sum as a prerequisite to acquiring title to a mining claim, a change in the mining law of the United States seems imperative.

Labor and Wages.—No labor disturbances of any importance occurred during the year. Sliding scales of wages based on the selling price of metal benefited the copper miners. Continued efforts to promote safety in mining resulted in a further reduction of accidents and fatalities.

ORE DRESSING

Smelting Factors.—Ore dressing, and especially flotation, has become the chief factor which makes a profit possible from the handling of low grade ores, for without this cheap method of eliminating the valueless waste portion of these ores the cost of smelting the entire ore as mined would be prohibitive. To-day very few jigs are used and concentrating tables have gone out of many mills so that in the majority of plants on sulphide ores the process is simply that of grinding to a fine size and employing only flotation. Common practice is to use jaw or gyratory crushers for coarse crushing down to 5 or 10 inches, Symons cone crushers for intermediate work down to one-half to one inch, sometimes followed by rolls to one-quarter inch before feeding to rod mills or ball mills to grind in two or three stages down to final flotation size of 0.01 inch or finer. The Symons cone crusher had a wonderful growth in 1929 and replaced other crushing devices in many mills. The use of more and better classifiers in connection with ball and rod mills to take out material as soon as it became sufficiently fine was a feature of grinding development in 1929, but the problem of reducing the large amount of power consumed in fine grinding still remains. Study by the U. S. Bureau of Mines on the fundamental theory of crushing and grinding was continued and some valuable points established, and this work may ultimately show how power consumption may be reduced.

Flotation apparatus, technique and results, have shown improvement. One of the latest developments in apparatus is the Miami-Dunn flotation cell of the air-jet or matless type. At the Miami copper mill in Arizona such a cell 100 feet long and 7 feet wide treats 3000 tons of ore in 24 hours. Reagents used in flotation are simple and small in amount. Differential flotation of two or more valuable minerals from one another was further perfected and expanded and had a marked effect on the production of lead and zinc as previously noted. A new mill for the flotation of oxidized lead ores went into commission in Utah and flotation of native copper ore in Michigan is now in use in every mill in that district. Research on flotation showed that chemical reactions are largely responsible involving a field of chemistry which deals with the action of a reagent in the very minute quantity of one part in 100,000 parts of water. With the knowledge thus gained, it has been found possible to float almost any mineral, whether sulphide, oxide or silicate. Oxide ores of manganese were floated in the laboratory. It is believed that in the future reagents will be found that will be sufficiently selective in their action to enable a separation to be made of any mineral from other minerals.

Bibliography.—*The Trend of Flotation* by Weinig and Palmer was again revised in 1929 and published as Quarterly of the Colorado School of Mines, Vol. 24, No. 4, 1929. It is the most up-to-date publication on Flotation today. A very comprehensive review of ore dressing progress by Richards and Locke appeared in *Mineral Industry*, Vol. 37, pp. 658-722, 1929.

COAL AND COKE

BY R. DAWSON HALL

ENGINEERING EDITOR, *Coal Age*

LABOR IN THE COAL INDUSTRY

Clashes and Adjustments.—Labor troubles were happily absent from the coal industry in 1929. The only disorder—and it was largely a battle of injunctions—occurred in Illinois between the international officials and the state officials of the union relative to its funds. This did not interfere in any way with the mine operators and, in consequence, they avoided sedulously any effort to interject their counsels into the dispute. Production continued unchecked by the disagreement. Efforts were made with some success to unionize the West Virginia and Kentucky fields.

Growth of Day Labor.—One of the important changes consequent on the introduction of machinery for loading coal has been the rapid growth in the use of day labor in the coal industry. In early days, only in haulage, preparation and merely incidental work was day labor employed. The men who cut the coal and loaded it were paid almost universally for each ton cut and loaded. They constituted the bulk of the employees. Now, with machines these men are paid by the day, even when the machine does not gather the coal but merely receives it from the hand shovel in order to raise and transport it to the mine car. Owing to the shortage of employment, a more coöperative spirit on the part of employees and a lessened demand on their brain and muscle, day labor has not proved as disappointing to the operators as they formerly feared it would in days when men were scarce, employees restive and the labor of loading was more exacting. In this approach to day-labor operation the anthracite region does not share because it is not introducing machinery for loading in anything like the degree manifested in the bituminous region. In many mines of that district loading machines are not feasible, for all the coal is delivered to the car by gravity.

COAL MINING FACILITIES

Loading machines are crystallizing into a few definite types, and the machines of 1929 are practically the same as those in 1928. One company has introduced a loading machine with only one conveyor in place of two. The general practice is to have a conveyor to elevate the coal and another to receive and deliver it at a variable angle depending on the relative positions of the car and the loading unit. Both of these are mounted on one machine. When the new single conveyor is used it follows a curved path but as it does not have as broad an angle of adaptability it remains to be seen if it will be as popular as the other machines made by the same firm.

Concrete Arch Roof Support.—In the Baltimore mine of the Hudson Coal Co. an arch of concrete block with compressible creosoted wood blocks has been introduced. This supports the lower part of the roof where it is broken loose from the main roof and tends to fall. The upper roof arches itself and is self-sustaining, supporting itself on the coal pillars and fallen rock. At times it readjusts itself by bringing a load on the arch described and deforming but not destroying it. The very weakness of this arch prevents its destruction, thus leaving it effective for the sustenance of the lower roof which is the purpose for which it is designed. This construction is known as the Schaefer arch and has been used extensively in Germany where one mine has no less than 510,000 linear feet of this construction. Such an arch can be used only in gangways as its cost is about $100 a yard. Fortunately, it is recoverable and needed imperatively in only a small part of the mine workings. Thus far the arch in the Baltimore mine is standing well with only such deformation as is expected and desired. Should it resist all deformation it might be apprehended that it was resisting stresses that were above its capacity and might, therefore, eventually collapse.

Stripping operations are making rapid progress, the quality of strip-pit coal improving year by year. Formerly coal of this sort had a bad reputation, but this is becoming history, as coal now is being mined in this manner at greater depth than at first. In many instances, the coal, being stripped, like coal which is mined by underground or deep mines, has been protected through the ages by solid rock and consequently it is of equal value with such coal. Also, it has become customary to erect preparation plants as elaborate as those found at underground mines for the same cleaning service, which of course, is more necessary with the strip than with the deep mines, for the coal is mined and loaded in bulk and so contains all its impurities, whereas the coal miner in the deep mines was required and expected to clean his product when loading it and in that case the preparation at the tipple was only a further refinement.

Shovels.—To attain greater depths and move larger quantities per bite of the bucket, larger shovels have become customary. This year one shovel with a 15-cu. yd. capacity bucket and one with a bucket of 16-cu. yd. capacity have been installed. The former is the larger shovel of the two as it is designed for use in strata half of which are limestone and shale rocks and only half detrital material. It also is intended to work to great depth, the boom being 120 ft. long. Into the mouth of either of these shovels a small motor car readily could be run. So far little cover in excess of 50 ft. in depth is being removed by such shovels, except where deeper cover occurs sparingly and must be handled for the operation of the rest. This applies, however, only to conditions under which the material is handled from face of cut to spoil bank by one operation. In the anthracite region the spoil is taken from the cut by shovels, loaded into cars, hauled away and dumped. That practice is possible where the coal is thick and sells, like anthracite, at a high price. It is not so feasible where the coal is thin and sells for the low price which bituminous coal commands.

Dragline Excavator. — In many cases the loose burden on the top of the bituminous coal is removed by a dragline excavator having a 170-ft. boom. This carries the material further and to a greater elevation than the shovel, which is then employed solely for the purpose of removing the rock cover, though, if this is thin enough, the shovel may remove some of the loose overburden also. At some strippings liquid oxygen with a carbon cartridge is being used as an explosive, the combination being electrically detonated to break up the rock.

FACTORS IN COAL PRODUCTION AND CONSUMPTION

Carbonization Processes.—To save by-products and to produce a relatively smokeless, sulphurless fuel, coal for some years has been subjected experimentally and commercially to low-temperature carbonization without omplete commercial success and sometimes without success either commercial or technical. Nevertheless, the prospect of reward for the inventor of a feasible process is so bright and reasonable that the search continues actively. For commercial success the plant installed must not be so costly that the profit will be absorbed by interest, depreciation, obsolescence and taxes. Most, if not all the present installations have been too costly to pay these charges satisfactorily until the values of the solid fuel, the gas and the by-products become higher than they have heretofore been. A few have involved investments that were many times too costly to permit of a return.

However, during the past year a growing appreciation has been shown regarding all the products of low-temperature carbonization. The demand for smokeless, sulphurless fuel, for instance, has been increasing, yet it is an interest not evinced by the consumer so much as by his neighbors and by the community in which he lives. In the desire for clearer skies smoke ordinances have become more numerous and drastic, inspections more active and rigorous but so far little threatens the domestic consumer. He continues to use smoky, sulphury coal and in a manner that makes it far more objectionable than need be.

Tar Acids.—The tarry acids from low-temperature carbonization have doubled in price, though high-temperature tar has declined in value and finds its market largely as a fuel. These acids are used in the manufacture of bakelite, a product that seems destined to be applied to the manufacture of a number of bulky articles of general use perhaps even to furniture and interior trim. Meanwhile formaldehyde, another constituent of bakelite, is becoming cheaper, thus making it possible to raise the price of tarry acids. Moreover, the oil obtained by low-temperature carbonization is found to have unusual anti-knock qualities. The creosote oils from the same source are richer in germicidal qualities than those of the high-temperature process. The gas also has a high thermal value.

New Carbonization Plants.—These facts are full of promise. It remains to be seen how long it will be before more than that can be said. During the past year an 800-ton a day K. S. G. plant has been built at New Brunswick, N. J. to carbonize bituminous coal, and a 100 ton-a-day Lurgi plant at Lehigh, N. D. where lignite is being carbonized and briquetted. A 600-ton low-temperature plant has been erected in Chicago replacing a 100-ton plant that has been operating at Farmersburg, Indiana. Along the Pacific Coast on both sides of the international line much activity has been shown in low-temperature distillation.

Calcium Carbide Spray.—A new development is the use of calcium chloride as a spray to cause the fine dust of coal to adhere to the larger coal thus allaying the dust nuisance. This spray is applied either at the mine tipple or in the coal yard. When used at the tipple it prevents the coal in the railroad car from freezing.

Coal Burning Regulation.—Much has been done to provide for the burning of coal smokelessly and with minimum labor in domestic furnaces, the coal being fed slowly and regularly to the burner by mechanical means and being removed as burned in a similar manner. Both anthracite and bituminous are being thus fed, consumed and removed. The balanstat has been introduced to perform for the coal consumer what has been achieved heretofore for other fuels by the thermostat, namely, the regulation of the coal fire so that it will maintain an even temperature in the rooms of a house despite changes in the heat of the surrounding atmosphere.

PETROLEUM

By Ernest R. Lilley

Associate Professor, New York University

CONSUMPTION AND EXPORTS

Oil Products Demand.—The year 1929 saw gasoline more firmly entrenched than ever as the outstanding source of income for the oil business. Kerosene, the major product of the nineteenth century, constituted but 6% of the volume of the products shipped by refiners. While consumption of this product in the United States showed a small increase over the previous year, this increase was more than offset by the decline in export demand. Sales of paraffin wax to both domestic and foreign markets declined substantially. The demand for lubricating oils showed the usual increase over previous years both in the United States and in Europe, the chief center of export demand. However, consumers were most exacting in their requirements, being willing to accept only the highest quality products. Demand for Pennsylvania grade lubricants was especially strong despite the relatively high prices asked for these oils.

Fuel Oil.—The continuance of the low prices for fuel oil established in 1928 led to substantial increase in the consumption of that product in the United States. Foreign consumption also increased, but American producers and refiners were not able to secure any benefits from this increase because of their inability to supply fuel oil at prices comparable with those at which it was offered by Venezuelan producers.

Gasoline.—The volume of gasoline sold was equal to approximately 44% of that of all the products shipped by refineries, a percentage only slightly less than that for fuel oil. Despite predictions to the contrary, expansion in gasoline consumption continued without diminution, daily deliveries to the domestic trade during the first ten months of the year averaging 1,032,000 barrels against 897,000 barrels in 1928. The rate of increase in the consumption of gasoline in foreign countries was even greater than in the United States. Thus refiners were able to export 168,000 gallons of gasoline daily during the first ten months of the year as against 146,000 daily in 1928, despite the tremendous increase in the quantities of this product produced from Russian, Romanian, and Venezuelan crudes.

PETROLEUM PRODUCTION

Crude Oil Development.—The final production estimate prepared by the U. S. Bureau of Mines indicates that the United States produced 901,474,000 barrels of crude petroleum in 1928. This is practically the same as the production of 1927, 901,129,000 barrels. Despite the general realization that the restriction of production during 1928 was only a beginning in the work of stabilizing the oil industry after the overproduction debacle of 1927 and the most strenuous efforts by leaders in business and governmental circles, the industry was unable to hold back the wildcatter and to keep unneeded oil below the surface. The production curve which had remained practically stationary for a year and a half began to rise in May and did not stop until it reached the level of 2,940,000 barrels a day in August, a quantity far in excess of the peak production in 1927. The rate of production during September and October was only slightly lower, but in November, with the season of low consumption at hand, stocks of crude greater than ever before, and widespread price cuts threatened, producers in the most critical areas signed proration agreements resulting in a decrease in the production of the country of 300,000 barrels daily. Despite this reduction the total production for the year rose to a new peak of approximately 1,009,500,000 barrels.

California Wells.—No single section of the country or any particular group of producers can be held responsible for this tremendous increase. Undoubtedly the greatest contributing factor was the enormous yield of the 7,000 and 8,000 foot wells in Santa Fe Springs and Long Beach in California. These old pools have defied all efforts to predict their future behavior. In August of 1928 Santa Fe Springs produced only 40,000 barrels daily; a year later its average was 282,000 barrels a day. This remarkable revival of an old area by deep drilling and the maintenance of the high yield of the deep producing horizons at Long Beach served to postpone the full development of the important pools that had been opened up at Elwood and Kettleman Hills.

Mid-Continent Wells.—In the Mid-Continent section the inevitable decline of the pools of the Seminole district was postponed by the discovery of a number of small extensions to the older producing areas. Anticipation of a more rapid decline caused a small increase in the price of Mid-Continent crude in the spring. This in turn led to the revival of activity throughout the Oklahoma-Kansas area. With the exception of the Oklahoma City pool no area of major importance appears to have been developed, but the aggregate increase in production was substantial. The drilling campaign at Oklahoma City resulted in outlining a deep producing horizon that can more than balance the decline at Seminole, whenever market conditions permit it to be operated at capacity.

Texas.—Pipe lines constructed to serve West Texas in 1927 have operated at capacity throughout the year. The production of the Hendricks pool suffered severely from the encroachment of water, but the Yates pool, together with other important but less sensational areas, has supplied any deficiency caused by this decline. Gray County led in a revival of the Panhandle section of Texas.

Gulf Coast and Appalachian Fields.—In the Gulf Coast area, the testing of a large number of salt dome structures discovered by geophysical methods was carried out in a systematic manner and began to show in increased production. The redrilling and flooding of old areas in the Appalachian field resulted in a moderate increase in production.

Other Fields.—Michigan for the first time became a producer of importance, its yield reaching 4,500,000 barrels. Inability to meet the price competition of other producing areas resulted in the shutting down of all but routine activity in the Rocky Mountain States.

Imports.—Increased production was reported from every one of major foreign producing areas with the exception of Mexico. This has resulted in increased competition in all foreign markets, and especially in Europe. In addition, the rapid development of the nearby fields of Venezuela seriously threatens to disturb the market in the United States. Crude oil imports into the United States were only slightly greater than in 1928. If exports of crude were deducted, the net imports would even show a decline as compared with 1928. However, imports of fuel oil and gasoline more than doubled. Imports of the latter product were increasing rapidly as the year closed, due to the completion of large cracking units in refineries located in the Dutch West Indies operating on low-priced Venezuelan crude.

STOCKS AND PRICES

Increased Storage.—On January 1, 1929, stocks of all oils in the United States equaled 619,725,000 barrels. During the course of the year approximately 65,000,000 barrels were added to this total. The greater portion of the quantity added was crude oil, but substantial amounts of gasoline and fuel oil were also placed in storage. Stocks of kerosene and lubricating oils remained about the same, but those of wax were almost doubled because of the inability of refiners producing lubricants from paraffin base crude to reduce their wax production to the needs of the market.

Price Factors and Trends.—Wax prices were naturally weak. Crude oil prices were well maintained throughout the year despite the steady increase in stocks. Gasoline prices were satisfactory during the first half of the year but became decidedly weak as the summer passed, and as it was realized that approximately 8,000,000 more barrels of gasoline would have to be stored over the winter than were carried over last year. Fuel oil prices were low throughout the period except in the Mid-Continent area where the demand for fuel oil for cracking purposes made the market somewhat firmer. Kerosene prices followed the trend of gasoline. In general, the prices received for lubricants were about the same as in 1928, but the demand for Pennslyvania grade lubricants made the year a most profitable one for that section.

GENERAL CONDITIONS IN OIL INDUSTRY

The year was one of mixed emotions to the oil industry of the United States. As a whole, the industry enjoyed one of the most profitable periods in its history, the companies comprising the Standard group paying larger dividends than ever before. Most of the larger independent companies reported substantial earnings. Yet, throughout the whole of the year and especially during the last half there was a feeling of doubt and uncertainty concerning the basic soundness of the underlying conditions. Cracking equipment had become an essential part of every refinery, partly because of the superior "anti-knock" qualities of gasoline produced by cracking over that produced by ordinary distillation and partly because more gasoline could be produced per barrel of crude than ever before. The casing-head gasoline industry, the source of 10% of the gasoline produced, had greatly expanded its production. Storage tanks were overflowing and the potential capacity of partially developed pools within the United States was greater than it had ever been. Except in areas controlled by the United States Government, proration and shut-down agreements had proved only partially successful. Crude and refined products from foreign fields were being laid down in foreign markets and along the Atlantic Coast at extremely low prices. To balance these unfavorable factors, there was at the close of the year a better realization of the nature of the problems confronting the industry, a greater willingness on the part of producers to coöperate in holding in unneeded production and, on the part of refiners, to limit their runs to market requirements, and a general tendency on the part of marketers to avoid price cutting and duplication of marketing efforts wherever possible. From a statistical standpoint, the condition of the oil business at the close of 1929 was decidedly poorer than at its beginning. Yet the industry was gaining an intangible asset of no small importance. Especially in the last few months it appeared to be making substantial progress in learning how to apply common sense and sound economics to its problems.

COPPER

BY SCOTT TURNER

DIRECTOR, UNITED STATES BUREAU OF MINES

WORLD PRODUCTION

Smelting Record.—Copper showed a record production during 1929, exceeding consumption only slightly, as indicated by a moderate increase of stocks. Both the average and maximum prices of the year largely exceeded those of any year since the notable recession of price following the war.[1] Discoveries and favorable developments both in Canada and Rhodesia greatly augmented world ore reserves, thus deferring the time when the astounding rate of increase in copper consumption must diminish through depletion of readily available, cheap supplies of the metal.

Output Tonnage.—World smelter production disclosed an increase over that of 1928 which year had exceeded the production of any previous year. The greatest tonnage-increase, and a substantial percentage-increase, came from the United States. The outputs of South America and Mexico likewise showed important increases, that of Mexico exceeding all other countries in percentage-increase. World copper stocks increased in 1929 over 1928.

DOMESTIC PRODUCTION AND CONSUMPTION

	1928	
Refinery production of new copper from domestic sources	1,791,797,387	tons
Refinery production of new copper from foreign sources	695,810,392	"
Imports of refined copper	84,730,630	"
Stocks of new refined copper on hand January 1	171,000,000	"
	2,743,338,409	"
Exports of refined copper (ingots, bars, rods or other forms)	1,020,799,531	"
Stocks December 31	114,000,000	"
	1,134,799,531	"
Total withdrawn on domestic account	1,608,538,878	"

STATE OF THE INDUSTRY

Prices.—Average price electrolytic copper at refinery in 1928 was 14.4

---

[1] 1929 figures not available until 1930.

cents with a rise in the average for December to 15.9 cents. January 1929 average was 16.603 cents. The average rose to 21.257 cents for March from which there was a recession to 17.77 cents for May, that level being maintained for several months. The peak of 24 cents in April appears to have resulted from a buyers' panic; many buyers, who had not realized that the steady advance in price was due to economic causes, attempted to fill their requirements at the same time. Apparently the producers did all that was possible to hold back the advance, being interested in the maintenance of a steady price at a proper economic level.

Integration.—The tendency to vertical integration of the copper industry has continued, as witnessed by the merger of the Chase Companies, Inc. (brass industry) with Kennecott which implies close relation of American Smelting and Refining in the consolidation. A copper exchange has been established in New York. The consolidation of American producers in sales of export copper appears to have become firmly established.

MINING

In the past year, improvements in operating methods and equipment has continued without abatement; adoption of electrified equipment, mechanical ventilation, skip-haulage in shafts, centralization of surface plants, the use of bonus and contract systems, the use of mechanical-loading devices in stoping, the use of geophysical and drilling methods for prospecting and development, and of drag-line-excavator systems of loading, have all been extended. Various caving and slicing methods were better adapted for underground use, and such improved practices have continued to reduce mining costs and to increase production per man-shift. At Sacramento Hill, Bisbee, underground caving methods were substituted for open-pit shovel-operations. Utah Copper continued the electrification of surface equipment. The Chino ore body is being prepared for underground mining by the Ray method.

MILLING

The principal trend of change in crushing is the use, at a number of plants, of disc and cone crushers to supplement the gyratory type. Such installations were made at Miami, Ray and Chino. There is a tendency toward the interposition of open-circuited bowl-classifiers between primary and secondary closed circuits, the primary classifiers discharging into the bowl-classifier, the latter removing slimes and sending a slime-free discharge of clean sand to the second unit. There is a notable increase in classifier capacities, and high circulation-loads were attained during the year. Recent practice is about doubling the loads in circulation. Anaconda has been able to replace 48 light-duty classifiers by the same number of heavy-load types that, aside from having a largely increased capacity, recover a finer feed. Miami has ordered the largest bowl classifier ever built. It is to be used for closed-circuit operation with secondary mills, the capacity being 3,000 tons of 48-mesh flotation-feed per day.

The extensive use of xanthate as a flotation reagent has had the effect of producing concentrates which settle and filter rapidly, and cause an over-supply of concentrate-thickeners in many plants. There is a tendency to install fewer and larger thickeners. Another improvement is indicated in the use of two-tray thickeners, the upper tray acting as a froth and feed-conditioning chamber. This was required for the breaking of persistent flotation froths. Utah Copper is replacing suction-boxes by Dorr classifiers. At Miami, the world's largest traction Dorr thickener, 325 feet in diameter, has been installed for de-watering and for returning to the mill 11,000,000 gallons a day of crystal-free water, rich in flotation reagents. A new flotation machine, the Miami-Dunn, has been introduced at Miami. Inspiration has improved its leaching practice by de-sliming the vat feed, sending the fines to the concentrator to remove sulphides, and returning them for leaching to a separate unit of the leaching plant.

SMELTING

Few notable changes are apparent. The ores or concentrates are usually roasted in furnaces of the McDougall, Herreshoff, or Wedge types. Almost always Cottrell units are used for the recovery of flue dust. The calcines from the roasting section are sent to reverberatory furnaces ranging from 19 x 100 feet up to 28 x 130 feet, as at El Paso smelter. The sizes from 19 x 100 feet to 21 x 120 feet are more common at present at most of the larger reduction works, capacities ranging from 700 tons per day for the smaller sizes, up to 1,100 tons for the larger ones. The charge is fed in several ways, including center, top, and Carson side-systems, the first being developed at the Hayden works and the second at the United Verde smelter. Various modifications of these three types of feed have been introduced from time to time, such as the change from the wasteful intermittent type to the modern continuous type, with steam boilers for the recovery of heat from waste gases. Reverberatories are now generally fired by powdered coal where fuel oil is not available. Magnesia brick is used below the slag-line and silica-brick above. Such linings last from 3 to 7 months, depending upon the character of the charges.

Four types of converters are used, including the Vertical Great Falls (10 to 20 feet diameter), Vertical Pierie-Smith (9 to 12 feet diameter), the Mankes, and the Pierie-Smith Horizontal type (13 feet diameter and 30 feet long). The latter has less lining-corrosion by siliceous flux as it permits use of the Garr gun for fluxing. The lining is generally basic. In most cases, the matte ladles and slag pots are now built of weldable steel that permits their repair; they are electrically operated. At some works, blister copper is now cast into anodes for direct use without further furnace refining. Blast-furnaces have been almost wholly discarded by American copper smelters except for special treatment of complex material. Several modern plants manufacture sulphuric acid from the SO_2 of furnace gases.

GENERAL OUTLOOK

Rate of Production.—A recent compilation by the United States Bureau of Mines[2] exhibits the increase of copper production from 1800 to 1927. This averaged 52.8 per cent per decade for the past 100 years. If this rate of increase continues, a production of about 3,000,000 tons a year will be required by 1940. In spite of this fact, there has recurred some apprehension that the copper industry of the Americas might be seriously injured by excessive production from newly discovered fields. The prospective new copper will come chiefly from Central Africa and Canada.

Canada.—While Canada as a whole is showing larger reserves and production year by year, the outstanding event in this connection is the development of the new ore body in the Frood mine at Sudbury. Accurate data as to this has not been published.

Central Africa.—Students of the world copper situation are interested in the effect of the new copper output of Central Africa. Compilation of available data indicates ore reserves in Katanga and Northern Rhodesia amounting to about 360,000,000 tons averaging 4.7 per cent copper with a total copper content of nearly 17,000,000 tons. Compiling the highest rate of production proposed as yet by the several companies indicates a maximum increase above the present output in the neighborhood of 600,000 tons of copper per annum by 1940. Central Africa, however, has its own peculiar labor problem, and the provision of adequate labor forces is becoming increasingly difficult, with the probable result that maximum production will be delayed. It is also probable that the mixed oxide-sulphide ores of several deposits similar to the ores of Bwana M'Kubwa will present greater difficulty in treatment than the straight chalcocite ore of Roan which has been proven readily amenable. A recently-published estimate predicts a yearly production of 400,000 tons of copper. This is deemed likely to indicate the probable order of magnitude of the anticipated increase.

---

[2] Julihn, C. E. "Summarized Data of Copper Production," *Economic Paper 1,* U. S. Bureau of Mines.

Ore reserves in Katanga, according to the latest figures of Union Minière, are 86,521,000 tons, averaging 6.93 per cent copper, with a copper metal content of 5,997,000 tons. Future exploration will probably increase these reserves of oxide ores. Production in Katanga will probably amount to 130,000 tons in 1929 and 200,000 tons a year by 1934. By 1940 a possible production of 300,000 tons is forecast. Data regarding the Northern Rhodesian reserves are less definite. The best present estimate, based on the results of drilling operations interpreted in the light of incomplete geological studies, is about 270,000,000 tons of ore averaging 4 per cent copper and containing nearly 11,000,000 tons of copper. This enormous total covers the following-named outstanding properties: Bwana M'Kubwa, N'Kana, N'Changa, Roan Antelope (considered together with Roan Extension and Muliashi), Mufulira and Chambishi. The minerals are predominantly sulphides (chalcocite chiefly, with bornite and chalcopyrite) although in some deposits a very large part of the ore is oxidized.

GOLD AND SILVER*

By Charles W. Henderson

U. S. Bureau of Mines, Department of Commerce

GOLD PRODUCTION

United States.—Gold production from 1792 through 1929 has been $4,500,000,000. The highest yearly production was $101,036,000 in 1915. It has remained between $52,000,000 and $44,000,000 annually during the period 1920-1929. During 1917-1929, dry and siliceous ores yielded about 63 per cent of the total output of gold; placer mining, 23 per cent; copper ores, 10 per cent; and all other ores, 4 per cent. During the last 23 years, nearly two-thirds of the production has come from dry and siliceous ores. The yield of gold from placers has been declining for 10 or more years. Alaska only will show an increase in output of placer gold in 1929, from new dredges at Fairbanks. That an increase in copper production will have little effect on gold production is apparent. It is extremely doubtful that further reductions in the cost of mining and milling can be effected in the old gold mining districts, where the recovered gold from dry ores now averages as follows: California, $8.95; Colorado, $5.35; and South Dakota, $4.00 to $4.84. Large-scale mining and milling of copper ores may be used for a broad index of the content of metal necessary to produce dividends. The Utah Copper Co., at Bingham, Utah, recovers at its mill, in the form of copper concentrates carrying 32 per cent copper, about 17 pounds of copper from each ton of rock mined and milled. These concentrates must then be smelted with, of course, some loss of copper before the copper is placed in ingot form. Seventeen pounds of copper, at present prices for refined metal, indicate roughly that the company has a gross of about $3.00 a ton, under which mining, milling, and other expenses must be kept. Utah Copper mills 60,000 tons of ore each day. The lowest grade of rock containing principally gold, now being mined and milled within the United States, is that of the Alaska Juneau Gold Mining Co. U. S. Bureau of Mines *Information Circular* No. 6186, published in October, 1929, records that the average gold assay value of the ore milled is 90 cents per ton. At this mine wholesale operations have been adopted, and 10,000 to 11,000 tons per day of gold-bearing rock are mined and sent to concentrators.

World Production.—U. S. Bureau of Mines *Economic Paper* No. 6, 1929, gives a detailed summary of data of world gold production from the earliest days to date. World production in 1929 was about $400,000,000. No new gold districts were discovered in the world in 1929.

---

* Note: Published by permission of the Director, U. S. Bureau of Mines. (Not subject to copyright.)

SILVER PRODUCTION

Silver production in 1929 did not vary much from the 1928 production of 58,462,000 ounces. Dry and siliceous ores (defined as those carrying less than 6½ per cent wet assay lead and 4 per cent wet assay copper) annually contribute about 22 per cent of the silver production; the remainder is a by-product of the base ores, respectively about 27 per cent from copper ores, 25 per cent from lead ores, and 23 per cent from lead-zinc ores. World silver production in 1929 was about 257,000 ounces.

GOLD AND SILVER CONSUMPTION

Manufactures and the Arts.—The Director of the Mint reports that gold furnished for use in manufactures and the arts has been from 1880 to 1928, inclusive, $172,375,000 of United States coin, $1,006,155,397 of domestic and foreign bullion and foreign coin, and old material reclaimed $507,669.340, a grand total of $1,686,199,737. In 1928, gold issued for use in the industrial arts was: bullion from the Mint $50,102,583, bullion in various forms from private refineries $5,478,076, and United States coin $3,500,000, making a total of $59,080,659, of which $27,511,159 was old material. Silver issued for the arts in 1928 totaled 35,547,663 ounces.

Monetary Stock.—The Director of the Mint also reports that June 30, 1929, money held in the Treasury was $3,789,886,214 and money outside of the Treasury was $6,603,282,569, a total of $10,393,168,783, from which $1,854,372,591 held in trust against gold and silver certificates and Treasury notes of 1890 should be deducted to determine the stock of money in the United States,—$8,538,796,192. In circulation was $4,746,296,562, or $39.62 per capita.

AVERAGE PRICES OF METALS AND CONTENT OF U. S. COINS

Gold.—A troy ounce of gold (480 grains) is fixed by law at a value of $20.671834625323. A $20 gold piece weighs 516 grains, of which 90 per cent—464.4 grains—is pure gold. A silver dollar contains 412.5 grains, of which 90 per cent—371.25 grains—is pure silver.

Silver.—In coining silver one ounce is valued at $1.292929. The average commercial ratio of silver to gold, with gold considered as of legal monetary value, was 35.26 to 1 in 1928. The average monthly New York price of fine bar silver per ounce for the fiscal year 1929 was $0.57045; the lowest price was $0.51625, on June 4, 1929, and the highest price $0.59875 on July 27, 1929.

Mint Income.—The income realized during the fiscal year 1929 by the Treasury from the Mint Service aggregated $5,721,339.06, of which $5,102,765.09 was seigniorage. The seigniorage on subsidiary silver coin was $1,561,296.35; on nickel coin, $1,103,279.68; and on bronze coin, $2,438,189.76.

U. S. MINING OPERATIONS

Alaska yielded $6,845,000 in gold and 454,700 ounces of silver in 1928. Production of gold in 1929 was slightly higher, the increase coming both from dredges at Fairbanks and lode mines in southeastern Alaska, notably that of the Alaska Juneau, near Juneau. The dredges in 1928 handled 6,620,000 cubic yards of gravel and produced gold valued at $2,185,000, or a recovery of $0.331 per yard.

Arizona yielded gold in 1928 valued at $3,967,488, of which copper ore furnished $3,329,643. There should be a slight increase of gold in 1929, because of the increased copper production. The largest producers of gold in Arizona were the United Verde, Copper Queen, Calumet & Arizona, New Cornelia, United Verde Extension, and Magma mines. Silver output in 1928 was 6,791,351 ounces, of which copper ore furnished 5,885,625 ounces. The largest silver producers were the United Verde, Calumet & Arizona, Magma, Copper Queen, and United Verde Extension mines.

California.—The total recoverable gold from ore and gravels treated in

California in 1928 was $10,785,315, of which 287 lode operations yielded $5,934,686 and 460 placer operations $4,850,629. The gold from lode mines comes chiefly (about 93 per cent) from dry ores. California produced 1,478,771 ounces of silver in 1928, chiefly (about 63 per cent) from dry ores of San Bernardino, Plumas, and Mono Counties.

Colorado in 1928 yielded, in terms of recovered or recoverable content, $5,304,876 in gold, and 4,052,203 ounces in silver. Production of gold decreased $935,000 in 1929. Dry ores contributed 93 per cent of the gold and 57 per cent of the silver. Lead-zinc ores contributed about 31 per cent of the silver. The total production of gold from Colorado from the discovery of gold in 1858 to 1928, inclusive, has been $706,544,055 and of silver, 649,151,690 ounces. The Colorado Coöperative Geological Survey has funds of $95,000 for the biennial period July 1, 1929, to July 1, 1931. This is a coöperative geological survey financed dollar for dollar by the U. S. Geological Survey and the State of Colorado, the Colorado Metal Mining Fund, and other State agencies under the authority of the Congress of the United States. The geological work is in charge of Dr. B. S. Butler, professor of Geology at the University of Arizona, aided by six geologists of the U. S. Geological Survey. The topographic work is done by the U. S. Geological Survey. The publication of results is done by the U. S. Geological Survey and by the Colorado Scientific Society.

Idaho is not a prominent producer of gold ($433,703 in 1928) but yields much silver, which was 8,998,330 ounces in 1928, mostly from lead ores, followed by lead-zinc ores, and copper ores. Out of which amount the Coeur d'Alene region alone produced 8,513,048 ounces of silver, the largest producers of which were the Bunker Hill and Sullivan, Hecla, Morning, and Sunshine mines.

Montana annually produces only about $1,000,000 in gold, but 11,000,000 ounces of silver, chiefly from copper and lead-zinc ores, mainly from Butte.

Nevada.—The gold yield in 1928 was $3,620,833, of which copper ores from Ely yielded $1,442,902, dry ores of Jarbidge $419,302, dry ores of Tonopah $415,035, dry ores of Goldfield $279,373, and dry ores from the Comstock district $180,442. The silver yield was 5,481,574 ounces, Tonopah yielding 1,900,315 ounces. Siliceous ores, treated chiefly by cyanidation, yielded 2,977,433 ounces, lead ores 1,595,463 ounces, copper-lead ores 485,946 ounces, copper ore only 258,519 ounces, and lead-zinc ores 165,374 ounces.

New Mexico in 1928 yielded only 680,360 of gold, and 827,793 ounces of silver. Copper ore yielded 50 per cent of the gold and 24 per cent of the silver; lead-zinc ore yielded 46 per cent of the gold and 67 per cent of the silver. The copper ore of the Chino mines, at Santa Rita, carries very little gold and silver.

South Dakota in 1929 yielded $6,523,000 in gold and 85,000 ounces of silver, compared with $6,560,805 in gold and 90,547 ounces of silver in 1928. The Homestake mine at Lead, the largest producing gold mine in the United States, did not equal its 1928 production in 1929. The Keystone Consolidated Mines Co. continued in 1929 to operate the Holy Terror and other claims at Keystone. South Dakota from the year of discovery—1875 to 1929, inclusive—has produced $280,779,000 in gold and 7,665,000 ounces of silver. Dividends of the Homestake have totaled $55,859,404.

Texas.—In 1929 the Presidio mine at Shafter produced 975,000 ounces of silver, as compared with 1,200,000 ounces in 1928. Production at the Hazel mine, 16 miles northwest of Van Horn, was 41,000 ounces of silver. The total output of gold from Texas mines from the first year of production—1885 to 1928, inclusive—mostly from the Presidio mine, has been $64,986, and for silver 21,362,768 ounces.

Utah in 1928 yielded $4,394,001 in gold. Copper ore contributed $2,380,657; lead-zinc ore $897,484; siliceous ore $528,656; and lead ore $552,500. The silver yield in 1928 was 17,072,852 ounces. Lead-zinc ore contributed

7,105,269 ounces; lead ore 6,241,616 ounces; dry or siliceous ore 2,355,975 ounces; and copper ore 1,275,682 ounces.

MEXICO AND CANADA

Mexico, which produced $14,451,721 in gold and 108,537,307 ounces of silver in 1928, produced in 1929 about $14,000,000 in gold and 93,000,000 ounces of silver.

Ontario.—Canada, which produced $39,082,005 in gold and 21,936,407 ounces of silver in 1928, will not make a very large increase in 1929. For the first nine months of 1929, Ontario produced $24,726,698 in gold, a gain over the corresponding period of 1928 of $1,028,250, but the destruction of the Dome mill in the Porcupine district, on October 28, will doubtless result in cutting down the gain from that Province about six hundred thousand dollars.

Quebec.—The Noranda [Rouyn district, Quebec) smelter blown in in December, 1927, increased Quebec's gold output for both 1928 and 1929. The Noranda second smelter unit was put in operation in November, 1929. Noranda Mines has declared a dividend of 75 cents a share, payable January 2, 1930. *Engineering & Mining Journal,* Dec. 14, 1929, announces dividends in December, 1929, and January, 1930, of $7,663,898 from McIntyre, Dome, Hollinger, Mining Corporation, International Nickel, Noranda, Lake Shore, Tech Hughes, and Nipissing.

British Columbia, in 1928, produced $4,068,640 in gold and 10,570,000 ounces of silver. Production for the first half of 1929 was 90,000 ounces of gold ($1,860,465) and 5,250,000 ounces of silver.

Yukon in 1928 produced $750,000, mostly from placers.

Manitoba produced $400,000 in gold in 1928. For description of the Flin Flon mine and its operations in Northern Manitoba see the *Engineering and Mining Journal,* July 13, 1929, pp. 55-56.

IRON AND STEEL

BY EDWIN F. CONE

ASSOCIATE EDITOR, *The Iron Age*

GENERAL

Unprecedented in many phases was the history of the American steel industry in 1929. Peaks in production were attained that were never approached before. With each month up to November, new totals in pig iron and steel were being made. In earnings new records were attained—companies in general were so prosperous that the slump at the end of the year did not greatly affect the year's showing.

STEEL AND THE STOCK MARKET

A rude shock to the general prosperity came with the stock debacle or "panic" late in October. Before this, however, the automobile industry had started to slow up and some think this was the beginning of the general collapse in securities. From November on there was a marked shrinkage in production of steel in general, but there would have been a seasonal shrinkage at the end of the year anyhow,—it was accentuated by the stock market break. And then too the pace of the steel industry had been too fast in the early part of the year—output was reported at over 100 per cent of capacity in the spring, an unusual occurrence. A more marked slackening, especially after a fairly more active summer, was bound to come. So with operations at the end of the year down to 60 per cent or under, the real effect of the stock panic on the steel industry cannot be measured until in the earlier months of 1930.

A RECORD YEAR IN PRODUCTION

Ingots and Castings.—Last year will go down in history as marking the largest production of both pig iron and steel ever recorded. The steel showing was a most unusual one. Production of ingots and castings, with December estimated, was about 56,100,000 gross tons, which is an increase of 8.8 per cent over the previous record of 51,544,180 tons in 1928. Of last year's total, 1,550,000 tons is credited to steel castings which is also a record for that branch of the industry. It is an increase of over 27.0 per cent above the 1928 output of 1,218,787 tons. The best previous record was 1,458,031 tons in 1923.

Pig Iron.—After a period of six years a new total was made in pig iron last year. With December estimated, the year's total, including ferroalloys, will probably approximate 42,700,000 tons. The nearest approach to this was the 40,361,146 tons in 1923. The 1929 total is 3.3 per cent in excess of the previous record in 1923 and exceeds the 1928 total by about 11.0 per cent.

A comparison of the estimated 1929 totals for pig iron and steel with recent years and the pre-war, or 1913, total is shown by the following table:

	Steel (tons)	*Pig Iron* (tons)
1929	56,100,000*	42,400,000*
1928	51,544,180	38,155,714
1927	44,935,185	36,565,645
1923	44,943,696	40,361,146
1913	31,300,874	30,966,152

* Estimated.

Finished Steel.—Naturally a new record is hung up in finished steel—probably over 40,250,000 tons. It is expected that the largest proportion of this went into the automobile industry as was the case in 1928,—particularly in view of the fact that automobile production for a large part of the year greatly exceeded that of the year previous.

IRON AND STEEL PRICES

Stability of prices during 1929, particularly in spite of the Wall Street collapse, is a feature of the year. Values of iron and steel products did not rise with the spectacular swiftness of stocks nor even of some staple products such as copper. According to the composite prices of *The Iron Age* on Dec. 17, the composite price of finished steel was 2.362 cents per pound which compares with 2.391 cents one year previously. The high point of the past year was 2.412 cents per pound on April 2 and the low was 2.362 cents on Oct. 29 showing that the effect of the Wall Street panic had been very slight from Oct. 29 to the end of the year.

STEEL EXPORTS

The year 1929 was one of the best of recent years in American steel exports. The record since the war was in 1920 when European steel-making nations were paralyzed and unable to furnish enough steel for their own use. These and other countries then turned to the United States. Since 1920 American exports have been small, gradually expanding the last three years. For 1929 a fair estimate is 2,540,000 gross tons, scrap excluded. A comparison of this record with other years follows: 1929, 2,540,000 tons; 1928, 2,350,000 tons; 1927, 1,945,000 tons, and 1913, 3,907,000. Thus while exports in 1929 were larger than in recent years, they are still under the pre-war rate.

METALLURGICAL DEVELOPMENTS

Stainless Iron. — Metallurgically there have been three major developments: stainless iron, nitrided steel and tungsten carbide tools. Progress in the metallurgy and heat treatment of the high-chromium and the high-chromium, nickel steels or so-called "irons" has been very rapid. The development particularly of the so-called "18 and 8" type has been a feature. This is a low-carbon steel containing 18 per cent chromium and 8 per cent nickel. Demand for it for many industrial purposes has expanded until at the close of the year some companies were weeks behind in their orders.

Nitrided Steel.—Hardening steel by a new method, introduced first in 1927 from Krupps, Germany, has grown into favor until it is used by many companies and is being experimented with by others. A special alloy steel, called "nitralloy," containing aluminum, chromium and molybdenum, takes a very hard surface when heated to a definite but low temperature in an atmosphere of ammonia. It is a new but simple method of carburizing. It has great promise of wide use for many purposes and in many industries.

Tungsten-Carbide Tools. — Also from Krupps there has come in the last year or two a new development,—cutting tools made of tungsten carbide. They have appeared under several names: "Widia" metal was the first one made in Germany, then came "Carballoy," "Dimmondite" and others—all essentially the same. They are tungsten carbide, a very hard material, amalgamated or cemented together with cobalt. A small piece of this material is brazed on to a cutting tool and so used. For some purposes it surpasses high-speed steel and by some it is expected to compete with it.

THE OUTLOOK

No attempt is made here to predict the course of the American steel industry in 1930. Very few are there who anticipate a record, either in output or profits, such as characterized 1929. It is more likely to be a "normal" year, rather than abnormal in prosperity or the opposite.

ZINC

By Walter Renton Ingalls
Consulting Engineer, New York

Industrial Condition.—The zinc industry of the world continued in a bad situation during 1929, and for the same reason as in the two years immediately previous. At the beginning of 1928 the effect of unfavorable conditions was clearly foreseen, but it was expected that amelioration would be in evidence by the end of 1929. That expectation has failed to be realized, and conditions have become worse rather than better.

Excess of Production.—The fundamental troubles are excessive production of ore, surplus of metallurgical capacity, and failure of consumption to increase materially. In respect of the last the world-wide depression in agriculture may be of influence; for the largest single use of zinc is for the galvanizing of iron and steel, and galvanized sheet, tubing and wire are largely required in connection with farming. The surplus of ore supply is ascribable to the flotation process for separating minerals, that has brought many new mines into production. The surplus of metallurgical capacity is partly an inheritance from the overbuilding during the war, and partly the increasing application of the electrolytic process for obtaining the metal.

Price Factors.—Substantially the same conditions exist both in Europe and America. During the major part of 1929 the American zinc industry conducted itself independently of Europe, taking advantage of its tariff protection of 1.75c. per lb. of metal and maintaining a price around 6.8c. per lb. at St. Louis, or 7.15c., New York. At that price our richer mines were profitable and the poorer mines could exist, down to those of marginal order, but the smelting industry was handicapped by inability to operate at anything more than 65% of its capacity. In the latter part of October the price for spelter at London, which was £26¾ at the beginning of 1929, had fallen so low that exports to the United States were threatened, and consequently the domestic price had to be reduced to avert that danger. In the early part of November the London price fell to about £20, which was the lowest since 1913, and the domestic price was reduced to just short of the balancing point, which was about 6.5c., New York. We arrived therefore at the unusual situation of control by Europe by our price for spelter.

Stock Market Influence.—The American prospect was rendered more gloomy by the phenomenal decline in the stock market, which very soon began to exert an adverse effect upon domestic business. Consequently American metallurgists were constrained to curtail production still more, which further impaired the position in respect to use of their capacity.

Distilling Improvement.—The program of improvement in American zinc-distilling practice that was instituted in 1928 was substantially completed in 1929, but the conditions hereinbefore outlined prevented us from ascertaining just what it will accomplish. The new process of distilling zinc ore in a large vertical retort experienced further development and appears now to be well on the way toward commercialization. A new electrolytic zinc plant was put in operation at St. Louis, making three of this class now going in the United States, and another one is in process of being designed. In Europe new electrolytic zinc plants were put in operation in Poland and Norway.

LEAD

By Allison Butts

Associate Professor, Lehigh University

GENERAL

The lead industry enjoyed a prosperous year in 1929, with production the highest ever recorded. Prices were at a rather low level, but were higher than during the preceding year. Consumption kept pace with production, except in the last two months, and even then the lead market was relatively active in comparison with other metals.

During the year work progressed on the new production source of lead at Mount Isa in North Queensland. This plant is expected to have a capacity of 58,000 tons of lead annually. The first unit is nearing completion; this will treat daily 1500 tons of oxidized ore by flotation and gravity concentration, and 500 tons of sulphide ore by flotation. These ores are being mined on the property. A smelter is being built at the same point to smelt the concentrates.

METALLURGICAL PROGRESS

Selective Flotation.—Revolutionary developments in the metallurgy of a common metal are usually a matter of several years' experimentation, trial, readjustment, and gradual adoption, rather than one of sudden fruition in a single year. They appear revolutionary only in retrospect. Selective flotation may certainly be described as a revolutionary process in the lead industry, and one that has already spread and is being adopted all over the world.

The Harris process of softening lead is another revolutionary process that has proved its worth, but in this case, at only a few plants. Its more widespread adoption may be retarded as much by business procedure as for metallurgical reasons.

Blast-Furnace Slags.—Perhaps the best idea of a recent technical progress can be gained by reviewing the year's literature and making note of articles which appear to be of considerable value. F. von Schlippenbach (*Metall u. Erz*, 25, 343) has made a study of the troublesome question of blast-furnace slags, particularly with reference to slagging of zinc. He concludes that ZnO and Al_2O_3 are not slagged in the ordinary sense, but are, independently of their ratio to each other, dissolved by silicates.

Sulphide Ore Treatment.—H. Skappel (*Metall u. Erz*, 25, 367) proposes an entirely new method of treating complex sulphide ores. He would fuse them and electrolyze the molten bath; depositing the different metals selectively.

Lead Alloys.—M. Sano (*Reports* Imperial Ind. Research Inst., Osaka, Japan, 10, No. 3) has studied the alloys of lead with antimony and nickel, with particular reference to their acid-resisting qualities, which he finds promising.

Corrosion Resistance.—D. W. Jones (*Jour. Soc. Chem. Ind.*, 47) has investigated lead, and the effects of impurities in it, as a corrosion-resisting metal, especially for coating other metals. He regards antimony as very injurious in lead used for this purpose. Copper is not very harmful and may sometimes be beneficial. Lead-coated and lead-sheathed wires, cables, and structural parts must be well supported, since continued stress induces inter-crystalline failure.

Blast Furnace Practice.—Of much importance to lead smelters is the investigation of blast-furnace practice being conducted by the U. S. Bureau of Mines. Headquarters for this work is at the Salt Lake Station, Utah. Five preliminary reports of results of this research were issued by the Bureau in 1929. These dealt with the composition and temperature of the furnace gases, both at the top of the furnace and in the tuyère zone, the formation and composition of the slag, descent of the stock column, and accretions. Many valuable data have been released. It is stated that the objects of the investigation are "to determine the conditions obtaining within the blast furnace by direct experimentation, and to correlate the behavior of the furnace at various times with the main factors governing the operation of the blast furnace, and metallurgical losses." The International Smelter at Tooele is coöperating in the work.

LEAD PRICES

The average price of lead in 1929 regained the ground which it lost in 1928. The average price for the year was 6.8 cents per pound, the same figure as the 1927 average. The 1928 figure was 6.3 cents. The higher prices, however, prevailed in the earlier half of the year when the market was most active. The price of lead in December, 1929, was 6¼ to 6½ cents per pound. These figures are for lead at New York.

LEAD PRODUCTION

Record Year.—Lead production in 1929 was the greatest yet recorded. This applies alike to world production and to United States output:—in both instances the 1929 figures surpass those of 1928 by 6 or 7 per cent. Thus the world's use of lead has been continually on the upgrade since 1921, except for a slight recession in 1928 which has now been more than counterbalanced. The total amount produced in 1921 was little more than half turned out last year.

World Production.—Turning now to actual figures for the leading producing countries, we note that the total world output for lead in 1929 approximated 1,950,000 tons of 2,000 lbs. smelter production, of which about 690,000 tons was contributed by the United States. Mexico was the second largest producer with about 275,000 tons, with Australia (190,000), Canada (160,000), Germany (115,000), Spain (95,000), and Burma 90,000) comprising the other principal producers. Of these countries Germany and Australia apparently had the most prosperous years in the lead industry, so far as can be judged by increase of output in comparison with 1928. Spain again exhibited the effects of depression. The United States, Mexico, and Burma made substantial gains, but Canada, though maintaining a high production after several years of extraordinary progress, apparently produced less in 1929 than in 1928. All of these figures are based on monthly estimates published by the American Bureau of Metal Statistics, with only rough estimates for the last two months of the year. The final figures, compilation of which of necessity cannot be complete for some months after the close of the year, will in most instances be within 5 per cent of the estimates given.

COGNATE SOCIETIES

American Gas Assn., 420 Lexington Avenue, New York City.

American Inst. of Mining & Metallurg. Eng., 29 W. 39th St., N. Y. C.

American Iron and Steel Institute, 75 West Street, New York City.

American Mining Congress, 841 Munsey Bldg., Washington, D. C.

American Petroleum Institute, 250 Park Ave., New York City.

American Zinc Institute, 27 Cedar St., New York City.

DIVISION XIII

MANUFACTURES AND TRANSPORTATION

GENERAL CONDITIONS IN MANUFACTURING

By L. Seth Schnitman

Chief of Division, Survey of Current Business, Department of Commerce

---

PRODUCTIVE ACTIVITY

A Record Year.—Despite a noticeable hesitancy in industry during the last two months of the year, partially traceable to the drastic decline in stock-market values, the year 1929 on the whole was the year of greatest production in American history. This unparalleled productive activity was unattended by any appreciable increase in stocks of manufactured goods, while the general level of wholesale prices, both for semi-manufactures and finished products, was lower than in the preceding year, a phenomenon, non-existant until recent years, but made possible by the widespread rise in industrial efficiency which has gained momentum since the depression of 1920-21.

Distribution of Manufactures.—On the whole, manufacturing activity during 1929 was more evenly distributed as between the industries than in any recent year. The output of automobiles through June was almost 50 per cent greater than in the corresponding period of 1928, but from that point forward, the relative increase declined until, by the end of the year, the total output of the industry was something more than 20 per cent greater than in 1928. The total production, amounting to more than 5,500,000 units, was the largest output of any single year. The tremendous activity in the automobile industry brought about substantial gains in the activity of many related industries, such as iron and steel, copper, and refined petroleum. During the year, the textile industries showed a recovery from the low levels of the previous year. The production of food products was somewhat greater than in 1928. Paper and printing were produced in larger volume. The production of tobacco manufactures and leather and shoes also showed gains.

Employment and Wages.—Employment in manufacturing industries, quite unlike conditions in 1928, the largest previous year in manufacturing, showed expansion, while wage payments in factories were also higher. This gain in factory employment and wage payments was accomplished during the year despite a continuation of the trend toward further mechanization in industry and the continuing war upon industrial waste.

Exports and Imports.—Exports of manufactured goods were larger than in any previous year. Continued growth in the export demand for manufactured articles has provided fuller employment to American labor and capital facilities than would have been possible with a stagnant foreign trade and has afforded, in addition, an increasingly effective cushion for any temporary decline in domestic consumption. Imports of manufactured goods were also greater than in any preceding year, reflecting the fullness of our purchasing power and providing, in the interchange, acceleration to the economic recovery of our export markets.

Construction Contracts and Materials.—Though lettings for new construction in 1928 showed a sizable decline from the previous year, when measured both in value and floor space, the backlog of large contracts placed in 1928 and the early months of 1929 made possible a quantitative output about as large as that reported for 1928. The decrease in new construction awards from 1928 was very largely due to a decline in residential building, approximating $1,000,000,000. Consequent upon the decline in new building contracts, building materials were generally produced in smaller quantities than in the previous year. Cement, brick, lumber, and enameled sanitary ware all showed lower output, but structural-steel production was greater than in any other previous year. In recognition of the importance of the building industry to general economic welfare, the Federal Government, as well as state and municipal governments, established towards the close of the year working plans for large public construction to take up whatever slack may occur in private construction.

LONG-TERM GROWTH OF MANUFACTURING

The long-term growth of manufacturing in the United States, as seen from the following table, is little short of remarkable. In fact the growth has been much greater than is indicated, as the data derived from the Census in recent years do not include, as hitherto, hand and neighborhood industries or establishments, where the value of products is less than $5,000 per year.

SUMMARY OF MANUFACTURES: 1849 TO 1927

Year	Number of Establishments	Wage Earners (Average Number)	Horse-power	Wages	Value of Products	Value Added by Manufacture
	Expressed in Thousands			Expressed in Millions of Dollars		
1849	123	957	(1)	237	1,019	464
1859	140	1,311	(1)	379	1,886	854
1869	252	2,054	2,346	620	3,386	1,395
1879	254	2,733	3,411	948	5,370	1,973
1889	355	4,252	5,939	1,891	9,372	4,210
1899	512	5,306	10,098	2,321	13,000	5,656
1904	216	5,468	13,488	2,610	14,794	6,294
1909	268	6,615	18,675	3,427	20,672	8,529
1914	273	7,024	22,421	4,068	24,217	9,858
1919	214	8,997	29,324	10,460	62,000	24,803
1921	196	6,944	(1)	8,200	43,619	18,327
1923	196	8,777	33,092	11,008	60,530	25,846
1925	187	8,382	35,767	10,727	62,668	26,771
1927	192	8,351	38,826	10,849	62,718	27,585

[1] Not called for on schedule.

MANUFACTURING OUTPUT PER EMPLOYEE

Volume and Wage Earners.—The tendency towards increased production per employee, which first made its pronounced appearance at the beginning of the present century, has as yet shown no hesitancy or abatement. During the decade from 1899 to 1909, the number of wage earners in factories, excluding hand and neighborhood industries, increased about 25 per cent, while the volume of factory output showed a gain of almost 60 per cent. In the years since the War, there has been a sharp decrease in the number of manufacturing employees, particularly accentuated when considered in the light of a growing population, yet factory output, measured either in value or quantitatively, has never before been so high.

Factors in Value and Output.—The number of workers in 1927 was about 7 per cent smaller than in 1919. The total value of manufacturing output, however, was one per cent greater than in 1919 when the price level was 45 per cent higher, while the combined effect of these changes, despite the drastic decline in prices, was an increase approximately of 9 per cent in the value of output per employee between 1919 and 1927, indeed a most remarkable achievement, since manufacturing became a potent influence in our economic existence. While this great development in the average output per factory worker has been, in a large measure, due to the increased use of labor-aiding machinery, there has, none-the-less, been a decided rise in the efficiency of management, education and intelligence of the employees and a most noticeable improvement in employer-employee relationship, ranging from stock ownership to group insurance and from representation to arbitration. During the transition, which is still continuing, average earnings per factory worker, which amounted to $437 a year in 1899, and $579 as late as 1914, advanced to $1,299 in 1927. During the same period, the total capacity of prime movers in factories multiplied almost four times, while the average horsepower per employee, more than doubled and amounted to 4.6 in 1927.

MANUFACTURING PRODUCTION IN 1929

Automobile Expansion.—The total factory output during 1929, as based upon the weighted index prepared by the Federal Reserve Board, was larger than in any other year. Analysis by the principal industrial groups indicates that the greatest expansion during the year occurred in the automobile industry, amounting to more than 20 per cent. The tremendous increase, both in the production and sales of automobiles during the year strikingly depicts the tremendous buying power of the American people, which flowed from a full employment at higher real wage levels than ever before. The total production of passenger automobiles during the year approximated 4,800,000 units, while the output of trucks approximated 750,000 units. Automobile output expanded during the spring, reaching its high level in April. From that point forward, it declined, until in December, it reached its lowest point for the year, which is largely a seasonal occurrence. The tremendous rise in automobile production, not only reflected the advance in our domestic living standards, but even the rise in the living standards of the world, since automotive exports were larger during the year than in any other preceding twelve months. The month of peak production of automobile tires was May, from which point a declining trend was apparent. The output of petroleum refineries, particularly gasoline, was sizably greater than in any other previous twelve months. The greatest production schedules were maintained during the second third of the year, the period of greatest demand. With better roads and the bulk of passenger-car production in closed types, the refining of petroleum has lost some of its seasonal characteristics, with much benefit to the industry.

Iron and Steel.—Evidencing the inter-relationship that exists between one industry and another is the fact that the automobile industry in 1929 accounted for at least 20 per cent of the total consumption of iron and steel and their products. The automotive industry, together with building, accounted for more than one-third of the total. It is little wonder then that the unparalleled productivity in the automotive industry and the large increase in awards for commercial and industrial construction should have provided the basis for a large increase in steel production. During May and June the steel industry operated at about capacity. From that point forward, productive activity of steel mills declined, until by the end of the year it was lower also than in the corresponding period of 1928.

Construction Materials.—As has been previously indicated, the decline in the awards for new construction, particularly due to lessened activity in residential building, was responsible for lower output of cement, brick and lumber. The total value of new building contracts awarded during 1929 showed a decline of more than 10 per cent from the previous year, while the floor space was off more than 15 per cent. Analysis of the construction data for the year on a value basis showed a gain of about five per cent over 1928 in commercial building, an increase of more than 15 per cent in industrial construction, with declines in the other major classifications, ranging from about two per cent for educational buildings to 30 per cent for residential construction. As has already been indicated, the decrease in construction awards, particularly as related to residential building, had its effect in a lowered demand for materials particularly identified with that type of construction. The production of fabricated structural steel, however, was greater than in any preceding year, reflecting the gains in new awards for commercial and industrial buildings, where steel, in large quantities, is utilized.

Miscellaneous Industries.—Of the remaining major industries, the output of nonferrous metals, principally copper, showed the most noticeable change from the previous year, where the increase amounted to about 15 per cent. The peak month of copper production by domestic smelters was April, since which month it declined rather slowly and for the last months of the year, the output was lower than in the corresponding months of 1928. Consumption of cotton, wool and silk was greater than in the previous year, while the estimated consumption of rayon was larger than in any other year on record. The output of shoes was greater than in 1928, while the production of newsprint paper was smaller than in the preceding year. The production of tobacco manufactures continued to show expansion and was more than five per cent greater than in 1928. The output of textiles and of leather was greater than in 1928.

MANUFACTURING TRENDS

The month-to-month comparison of the volume of manufacturing production for the year, after allowances for the usual seasonal variations, showed continuous expansion during the first six months of the year, but from midsummer forward lessened industrial activity was apparent, the output for the last month of the year being about on the level of the first month. All in all, the year 1929 continued the up-trend in industrial activity, which has now been almost unbroken for a period of eight years. While some industries lagged behind the general growth of manufacturing activity, yet the year showed a greater evenness as between the several industries than in recent years. Dividend payments by industrial and miscellaneous corporations during the year reflected this condition in the rise over the previous year amounting to 20 per cent. The year was noteworthy for its increased distributions and unparalleled number of initial dividends on junior corporate securities. This increased manufacturing activity had its effect upon all branches of trade, which in turn showed sales volumes larger than have been hitherto recorded. An interesting commentary on the state of the Nation's manufacturing is found in the decline of six per cent from the year 1928, in the amount of defaulted liabilities of failing manufacturing firms, while the growth of group insurance, showing a gain of more than five per cent in the number of certificates over the year 1928, bears striking evidence as to the growing betterment of relationships between employer and employee.

ADMINISTRATION OF THE TARIFF

By J. D. Nevius

Deputy Commissioner of Customs, Treasury Department

COLLECTION DISTRICTS

Ports of Entry.—There are forty-seven collection districts of the United States, which include one each in Alaska, Hawaii, and Porto Rico. These districts contain three hundred ports of entry, one port in each district being designated as the headquarters port, at which port the Collector of Customs, who is the principal customs officer of the district, is stationed.

Airports of Entry.—In addition to the three hundred ports of entry the following airports of entry have been designated under the Air Commerce Act of 1926:

Place	*Name of Field*
Key West, Fla.	Meachem Field
St. Paul, Minn.	Municipal Airport
Seattle, Wash.	Bryn Mawr Field (abolished Dec. 27, 1928)
San Juan, P. R.	Escambron Field
Seattle, Wash.	Boring Municipal Field
Albany, N. Y.	Municipal Field
Miami, Fla.	Pan American Field (or 36th St.)
Los Angeles, Calif.	Entire Customs Port
Seattle, Wash.	Lake Union
San Diego, Calif.	Ryan Flying Field
Newark, N. J.	Metropolitan Airport
Buffalo, N. Y.	Municipal Airport
Detroit, Mich.	Grosse Isle Airport

Appraisers.—Appraisers of Merchandise are designated and assigned to sixteen of the larger headquarters ports. At other ports certain officers of the Collector's force are designated acting appraisers.

Surveyors and Comptrollers of Customs.—Surveyors of Customs are assigned to the ports of Portland, Me., Boston, New York, Philadelphia, Baltimore, New Orleans, and San Francisco, and Comptrollers of Customs to the ports of Boston, New York, Philadelphia, Baltimore, New Orleans, Chicago, and San Francisco.

CUSTOMS FUNCTIONS

Collections.—Although Customs is one of the oldest branches of the Government, popular conception of its functions goes little beyond the apprehension of smugglers and the examination of passengers' baggage on trains and piers. Duties collected on passengers' baggage, however, amount to only about three-fifths of one per cent of the total customs receipts. Customs receipts for the fiscal year 1929 were $610,899,947.82. Of this sum, approximately $4,524,104.61 resulted from baggage examinations, and $7,353,072.75 from informal mail entries, while over half a billion dollars was collected on cargo and freight importations.

Examination.—All imported merchandise, whether dutiable or free, is required to be submitted to Customs for examination. If the value of an importation exceeds one hundred dollars a formal entry thereof must be made. Certain exceptions to this requirement are set forth in the Tariff Act of 1922 (Sec. 498), the principal exception covering "articles carried on the person or contained in the baggage of a person arriving in the United States." While the opinion seems to be prevalent among uninformed people that used articles and worn clothing are exempt from duty, this idea is erroneous as all clothing and other articles acquired abroad, whether worn or used while abroad, are subject to duty in their condition as brought in.

Consumption Entries.—Merchandise may be entered for consumption; for warehouse; for transportation and exportation; or for immediate transportation without appraisement. A consumption entry is the usual form and is used in cases where it is desired to pay the duty on the arrival of the importation at the port of entry and to secure delivery.

Warehouse Entries.—If immediate possession of the merchandise is not essential and the importer desires to postpone the payment of duty, a warehouse entry may be made. Under this form of entry, the merchandise is sent to a bonded warehouse and duty is not paid until withdrawal therefrom. Merchandise remaining in bonded warehouse for more than three years becomes abandoned to the Government and is sold at public auction.

Transportation Entries.—An entry for transportation and exportation permits merchandise to be shipped in bond through the United States to a foreign destination without the payment of duty; and the immediate transportation entry permits an importation to be shipped in bond from the port of first arrival, without appraisement or the payment of duty, to an interior port, where a consumption entry or warehouse entry may be made.

ENTRY DOCUMENTS

Forms.—Documents required to be furnished the office of the Collector of Customs in making a formal entry of merchandise include the entry (Form 7501), declaration of ownership (Form 3347), bond for redelivery, production of missing documents, etc. (Form 7551), delivery permit (Form 7501a), a bill of lading and consular invoice. A form is now in quite general use, however, combining the entry, declaration, and redelivery bond.

The consular invoice is made out by the shipper on special forms furnished by the American consular officers, the shipper being required to certify to the truth of statements contained in the invoice before the consular officer at the place of manufacture or sale. Copies of this invoice are forwarded to the importer for use in making the customs entry.

CUSTOMS PROCEDURE

Examination.—When the entry is presented at the customhouse, an entry clerk examines it to determine if it is complete and properly executed. He then checks up the calculations and makes an estimate of duties to be paid, which the importer deposits. The delivery permit, stamped to indicate that the duties have been paid, is then given the importer, which, on presentation on the pier, authorizes the inspector to deliver certain packages to the importer and certain other packages, indicated on the permit, to the Appraiser's Stores for the necessary examination and appraisement.

Appraisal.—An examiner at the Appraiser's Stores examines the merchandise and approves the entered values or advances them if he believes them to be too low. While the determination of the rate of duty to be paid is a function of the Collector, an advisory classification of the merchandise is made at the Appraiser's Stores. If no irregularities are discovered, the importer is notified to call for his packages. If irregularities are discovered in the examination packages, the examiner may call on the importer for the redelivery of the balance of the importation, which have been removed from the pier on the delivery permit, which redelivery the importer is bound to make under the terms of his redelivery bond, so-called.

Duty Levies.—After the work at the Appraiser's Stores has been completed, the papers are returned to the Collector, where the duties owing to the Government are computed. This is known as liquidation of the entry. If the liquidated duties are less than the estimated duties which have been deposited, the difference is refunded to the importer, and if the liquidated duties are higher than the estimated duties the importer is called on for an additional deposit.

Appeals.—If the importer is dissatisfied with the appraisement, he may, by appeal, secure a review by the United States Customs Court (formerly Board of General Appraisers) of the Appraiser's decision (Sec. 501, Tariff Act, 1922). Likewise, a review by the United States Customs Court and Court of Customs and Patent Appeals of decisions of the Collector may be obtained by the filing of a timely protest (Sec. 514, Tariff Act 1922).

Law Violations.—The Secretary of the Treasury is authorized to pay an award to any person other than a Government officer furnishing information to a Customs officer regarding a violation or contemplated violation of the customs laws, which information leads to a recovery of duties, penalties or fines, the amount of such award to be 25 per cent of the net amount recovered, but not to exceed $50,000 (Sec. 619, Tariff Act 1922). In the year 1929, approximately $1,000,000 was recovered by the Government as a result of information furnished under this provision of law.

CUSTOMS RECEIPTS AND TRANSACTIONS

In the year 1914, the port of New York collected 68% of the total customs receipts of the United States. This percentage in 1922 was 63%; in 1923, 57%; in 1924, 58%; in 1925, 55%; in 1926, 55%; in 1927, 54%; in 1928, 57%, and in 1929, 57%. As this indicates, the greatest increases in customs collections have been at ports other than New York.

The following condensed table of customs transactions indicates the progress of the service.

Consumption Entries:	1922	1923	1924	1925	1926	1927	1928	1929
Free	182,267	209,778	206,154	209,319	226,382	246,257	246,577	264,194
Dutiable	310,722	389,511	416,449	428,989	459,726	486,274	495,695	501,705
Informal entries	120,231	145,151	164,102	182,505	196,036	209,002	214,777	214,503
Mail entries...	508,500	560,498	838,773	742,917	768,811	786,683	825,925	838,228
Baggage declarations	234,470	284,644	339,541	340,685	383,607	392,128	400,894	397,823
Drawback entries	15,153	11,021	13,971	21,477	24,388	25,230	26,950	29,799

ORGANIZATION AND PERSONNEL

The administration of the customs laws is under the jurisdiction of the Commissioner of Customs, who is appointed by the Secretary of the Treasury, and to whom is entrusted many of the important powers and duties conferred by law upon the Secretary. Prior to 1927 this organization was known as the Division of Customs and the chief officer as the Director of Customs. The Commissioner is assisted by an Assistant Commissioner and two Deputy Commissioners, one in charge of the legal work, and the other in charge of investigations. Assistant Secretary of the Treasury, Seymour Lowman, is in charge of the Bureau of Customs, Bureau of Prohibition, and the Coast Guard. Ernest W. Camp was the first Commissioner of Customs. Mr. Camp resigned to engage in private business on May 15, 1929. F. X. A. Eble succeeded Mr. Camp as Commissioner of Customs, on July 8, 1929, having been appointed to that office at the time of Mr. Camp's resignation.

THE UNITED STATES TARIFF COMMISSION

By Thomas O. Marvin

Chairman, United States Tariff Commission

FLEXIBLE TARIFF PROVISIONS

Reports to the President.—During the year 1929 the work of the Tariff Commission has been concentrated first, upon the preparation of information for the use of the Congress and the Committees of Congress in the pending tariff legislation, and second, upon the completion of a number of reports to the President under the flexible tariff provisions. During the fall and winter of 1928 and the early part of 1929 the Commission concentrated upon the completion of fifteen reports to the President under the provisions of Section 315 of the present Tariff Act, and in a period of a few months more reports were completed than in any other similar period since the enactment of the flexible provisions. These reports included such important and extensive subjects, from the point of view of research, as window glass, onions, milk, cream, peanuts, eggs and egg products, flaxseed, linseed oil, canned tomatoes, and corn.

Window Glass.—Until recent years most of the window glass was produced by the so-called hand blown process; that is, cylinders 12 to 15 inches in diameter, and about 5 feet in length, were mouth-blown and manipulated by hand. About 1905 the machine-blown cylinder process came into prominent use, and by 1926 less than 2 per cent of the production of window glass in the United States was by the hand-cylinder method. About ten years ago the manufacture of window glass by the so-called sheet process became important. By this process sheets are drawn from the molten mass of glass over rollers, and through an annealing oven. In 1927, out of a total production in the United States of 481,000,000 square feet of window glass, approximately 50 per cent was produced by the machine-cylinder process, and the other 50 per cent by two forms of the sheet process. In Belgium mouth-blowing still persists to some extent, although rapidly declining. In 1927, out of a production of 566,000,000 square feet, only 167,000,000 were mouth-blown. The proportion of mouth-blown glass in Belgium was still further reduced in 1928 and 1929. Imports of window glass in recent years have averaged from 70,000,000 to 80,000,000 pounds annually. Competition from imports has been especially keen because of the decline in unit prices. The average foreign value of imports immediately after the war was over 11 cents per pound. By 1924 it was 7.5 cents per pound, and in 1928, 3.7 cents per pound.

The Commission obtained cost of production data for all of the important producing window glass plants in the United States, and through the coöperation of the Belgian producers, for about 55 per cent of the production in Belgium. The plant cost in the United States, including interest, but not marketing or transportation, in 1926, was 4.24 cents per pound, and in Belgium 2.4 cents per pound. Transportation in the United States to the principal market averaged about 0.5 cent per pound, and from Belgium to the United States about 0.4 of a cent. The difference in costs, including transportation, was therefore approximately 2.3 cents per pound. The average duty collected under the various brackets in the window glass paragraph of the Tariff Act was approximately 1.5 cents per pound. The maximum increase in the duty under the provisions of Section 315 is 50 per cent of the existing duty, or a total of about 2.25 cents per pound. Upon the basis of these facts the President, on May 14, 1929, increased the duty in the various brackets covering window glass by 50 per cent.

Onions.—There are many types of onions produced in the United States, the most important of which are the fall and winter onions, produced largely in New York, Ohio, Indiana, and Illinois, and in the Pacific coast states; the Bermuda onions produced principally in Texas, and the American Spanish onions produced in Washington, Idaho, and Utah. Imports of onions to the extent of 100,000,000 to 140,000,000 pounds annually come directly from Spain and Egypt. As a rule Spanish imports are the heaviest, but in 1927 each country sent slightly more than 50,000,000 pounds to the United States. In 1928 about 55,000,000 pounds came from Spain, and 20,000,000 pounds from Egypt. In addition, about 12,000,000 pounds of the Spanish type of onions came from Chile. The Spanish onions are carefully selected, graded, and packed in crates. Domestic Bermudas are not so carefully crated as the Spanish. The domestic Spanish type is as a rule sold in sacks, largely ungraded and uncrated. When the domestic Spanish onions have been crated, and such costs averaged in with the cost of the domestic Bermudas in crates, the average cost of production of the two types at their shipping points was approximately $2.20 per 100 pounds for the last two years ended with the season of 1927. The weighted average invoice value of imported Spanish onions for the same seasons was approximately $1.45 per 100 pounds. Transportation from the domestic producing areas to New York was about $1.49 per hundred pounds, and from Spain to New York was about 73 cents per hundred, making a total average cost of about $3.68 for domestic Spanish and Bermudas, and $2.18 for the landed cost of the Spanish onions, or a difference of approximately $1.50 per hundred pounds. On December 22, 1928, the President increased the duty on onions from 1 cent to 1½ cents per pound.

Milk and Cream.—The Commission's milk and cream investigations centered around the surplus-producing areas in northern New England, and New York, Pennsylvania, and Wisconsin, with the contiguous territory in Canada, from which milk is shipped to the eastern markets and to the border points for further conversion. Imports of milk have ranged from 5,000,000 to 7,000,000 gallons, valued at more than $1,000,000 annually in recent years. Imports of cream have been about 5,000,000 gallons annually, valued at nearly $8,000,000. The average cost of producing fluid milk in the United States for the year ended April 30, 1926, including delivery to border plants, was 25.5 cents per gallon. The average cost of the Canadian milk for the same period, and delivered to the same plants, was 21.2 cents per gallon. Upon the basis of these facts the President, on May 14, 1929, increased the duty upon fluid milk from 2½ cents per gallon to 3¾ cents per gallon, the maximum change permissible under the law. The total cost of producing cream in the United States, including transportation to the principal markets, was found to be approximately $2.59 per gallon. Canadian cream cost approximately $2.27 per gallon, making a difference in cost of approximately 32 cents per gallon. On May 14, 1929, the President increased the duty upon cream from twenty to thirty cents per gallon.

Peanuts.—The most important types of peanuts produced in the United States are the Virginia and Spanish types. Out of a total production of about 867,000,000 in the shell, in 1927, about 330,000,000 pounds were of the Virginia type, and the remainder were largely of the Spanish and runner types. Most of the imports are of shelled nuts, averaging 30,000,000 to 60,000,000 pounds shelled, and 4,000,000 to 8,000,000 pounds not shelled. The imported shelled nuts are widely distributed over the United States, with Chicago as the principal market. Unshelled nuts are marketed largely on the Pacific coast. The domestic cost of peanuts in the shell, of the Jumbo grade, delivered in New York for the two seasons ended in 1926, was 9.165 cents per pound; delivered at San Francisco, approximately 10 cents per pound. The cost of Chinese peanuts of a similar grade, delivered at San Francisco, was 4.917 cents per pound. The average cost in the United States of shelled peanuts of the extra large and number 1 grades, delivered at Chicago, was slightly over 11.28 cents per pound. The cost of similar Chinese grades, delivered at San Francisco, was approximately 5.30 cents per pound, making an approximate difference in costs of production, including transportation, of 6 cents per pound. The difference in cost, for both the domestic and foreign products delivered at San Francisco, was slightly over 6.33 cents per pound. On January 19, 1929, the President increased the duty on unshelled peanuts from 3 to 4¼ cents per pound, and on shelled peanuts from 4 to 6 cents per pound.

Eggs and Egg Products.—Eggs and egg products are imported into the United States in the form of shell eggs; frozen eggs in various forms, such as so-called whole eggs, frozen yolks, and whites; and dried eggs either as egg albumen, whole eggs, or yolks. The imports of dried and frozen eggs come chiefly from China. 8,000,000 to 10,000,000 pounds of dried eggs are imported annually, and 8,000,000 to 20,000,000 pounds of frozen eggs. Relatively few hen's eggs are imported in the shell from China. According to the commission's cost of production study domestic frozen eggs cost, including transportation to New York, approximately 25.86 cents per pound, and Chinese frozen eggs, delivered to the same market, cost 18.33 cents per pound, or a difference of 7.53 cents per pound. On February 20, 1929, the President increased the duty on frozen eggs from 6 to 7½ cents per pound.

Flaxseed and Linseed Oil.—Although the Commission's investigation of flaxseed and linseed oil were conducted independently of each other, the results may properly be reviewed together. The domestic production of flaxseed averages from 20,000,000 to 25,000,000 bushels annually, and is produced principally in Minnesota, North and South Dakota, and Montana. Imports range from 18,000,000 to 22,000,000 bushels annually, of which 15,000,000 to 20,000,000 come from Argentina, and 2,000,000 to 6,000,000 from Canada. The domestic production of linseed oil has been about 100,000,000 gallons annually in recent years. Imports of oil are small, averaging about 1,000,000 gallons annually. Most of the imports of flaxseed products are in the form of seed rather than oil or cake. The seed constitutes more than 90 per cent of the cost of the oil and cake. Tariff problems, therefore, center largely around the seed. The cost of production of flaxseed in the United States for the two-year average of 1925-1926 was approximately $2.54, including transportation to New York, and $2.42, including transportation to Buffalo. Invoice prices and other information were used as evidence of production costs of flaxseed in Argentina. The cost of Argentine seed landed in New York, ex-duty, was $1.98 per bushel, for the two-year average, and landed at Buffalo was $2.06, or a difference in cost of approximately 56 cents per bushel in New York, and 36 cents per bushel at Buffalo. The cost of production of linseed oil in the United States for the two years 1925-1926, including transportation to New York, averaged about 12.25 cents per pound. The cost of oil from the Netherlands as evidenced by invoice prices and other information, including transportation to New York, was 8.55 cents per pound. The difference in cost was about 3.7 cents per pound. On May 14, 1929, the President increased the duty upon flaxseed from 40 cents to 56 cents per bushel, and on June 25, 1929, the duty on linseed oil was increased from 3.3 cents per pound to 3.7 cents per pound.

Canned Tomatoes and Corn.—The Commission has completed its investigations for purposes of Section 315 respecting canned tomatoes and corn. The reports upon these subjects have been published at the request of the Senate for use in connection with the pending tariff legislation. The President has issued no proclamations changing the duty upon these products under the flexible provisions.

PENDING TARIFF LEGISLATION

Information Summaries.—Although the Commission has completed a number of reports to the President under the flexible provisions, much of the time of the Commission's staff during 1929 has been spent in assembling and presenting information to the Congress for use in connection with pending tariff legislation. Statistical and other information bearing upon the subject have been in process of compilation for a number of years, but about December 1, 1928, there was an intense concentration of all the members of the staff upon the preparation of the material for publication. Early in the year 1929 Summaries of Tariff Information began to be published by the Ways and Means Committee, schedule by schedule, as the material was prepared by the Commission. During a period of a few weeks thousands of pages of manuscript were drafted, revised, and reviewed by senior members of the staff, and by the Commission itself, and printed for the use of the Congress. Much of the summaries were in the form of condensed tables showing, for all of the commodities mentioned in the Tariff Act, production, import, export, and price statistics for a number of years, usually ten, ending with 1928. In addition brief statements of competitive conditions affecting each commodity under consideration were made, and all of the Treasury Decisions for a number of years past were referred to and summarized for each product. These summaries were finally published in two large volumes, and have been in continual use by members of the Congress during the consideration of the tariff bill.

Hearings and Contacts in Congress.—The Summaries of Tariff Information referred to above consist of a summary of the information bearing upon tariff matters which the Commission has in its files. Much of the data was made available to the Committee on Ways and Means, and the Senate Committee on Finance, by the personal contacts of the Commission and members of its staff with members of the committees. At the request of the committees commodity and other experts of the Commission were present both at the public hearings and at the executive sessions in which the bill was drafted and revisions prepared. Material from the Commission's files were presented from day to day by members of the staff as the particular subject matter under consideration required. Immediately pertinent information was supplied either to the committee as a whole, or to individual members in the discussion of particular subjects. In a few weeks information compiled annually for a number of years has been made available to the Committees of Congress while each subject has been under careful consideration.

THE EXPORT AND IMPORT BALANCE

By Ray Hall

Senior Economics Analyst, Department of Commerce

FOREIGN TRADE EQUILIBRIUM

Statistical Review.—America's foreign trade balance in 1929 continued to be "favorable." The last annual excess of merchandise imports occurred in 1873. Indeed, there have been but few monthly "deficits" of this kind, none of which has fallen in the last quarter of the year, at least in the present century. Most of them have been in the spring; the latest one was that of April, 1926. In the five years 1923 to 1928 inclusive, our monthly exports and imports fell into almost perfect equilibrium in either June or July. In none of these "equilibrium months" was the difference between total exports and total imports more than $2,000,000—in a total monthly trade averaging nearly $650,000,000. No such fine matching of the two sides of our foreign trade account occurred in any month of 1929; although in April and in May the excess of exports was only $15,000,000, in each case.

Excess of Exports.—An unusual coincidence appeared in America's trade figures for the first nine months of 1929. Although total trade for the period was $7,211,000,000, against $6,628,000,000 for the like period of 1928, the excess of exports over imports in both periods was $487,000,000. Moreover, exports and imports both increased by $292,000,000.

Coincidental Balances.—By accident, the exporters and importers of the nation so ordered their affairs as to leave one of the most important balance-of-payments items unchanged during two like periods. Persons believing that trade follows the loan; that it follows prices or gold movements of past periods; that it follows purchasing power parity of present periods; or that it follows exchange rates are afforded a free laboratory experiment to test their hypotheses. This is not, however, the only gratuitous experiment of its kind in recent years. The trade balances of the calendar years 1923 and 1926 were $375,000,000 and $378,000,000 respectively; while those for the calendar years 1920 and 1921 were $2,871,000 and $2,862,000 respectively.

TRENDS AND COMPARISONS

Net Export of Capital.—Having now the trade balances for the two periods, having exact figures for gold shipments and earmarkings, and having an idea of the trends of the other principal items in our foreign dealings, we can sketch rough balances of payments for the two periods and derive, British-fashion, estimates of the change in our net export of capital.

The Gold Movement.—The two periods witnessed a violent reversal of the gold movement. During the January-September period of 1928, our net gold export was $435,000,000, from which $159,000,000 should be deducted for earmarking operations. During the like period of 1929, our net gold import was $245,000,000, from which $30,000,000 should be deducted for earmarking operations. The reversal of the gold movement in the two periods affected our international accounts, therefore, by $501,000,000.

Factors in Capital Export.—Probably no important fluctuations appeared in any of the numerous other "current" (non-capital) items except tourist expenditures, net yield of foreign investments, and changed volume of merchandise payments in lag. In the later period, tourist expenditures were a debit of probably about $50,000,000 more, net yield of foreign investments was a credit of only about $20,000,000 more (because of higher rates paid on foreign balances at New York), and the changed lag in merchandise payments was a plus of something like $61,000,000. With these few strokes, we establish that our net export of capital, long-term and short-term, in the first three quarters of 1929 was about $470,000,000 less than in the like period of 1928.

Brokers Loans.—This figure of our reduced foreign lending can be put to a surprising use. The new nominal capital (par value minus refunding) of "foreign securities publicly offered in the United States" was 437 millions less in the later period—the figures being respectively 985 and 548 millions. Reduced public offerings thus accounting for virtually all the reduced export of capital, all other capital operations (as a group) continued little changed in volume. How, then, could there be a really stupendous inflow of foreign capital into brokers' loans during the later period, as certain financial writers have asserted? Really stupendous increases of foreign funds in brokers' loans could come only from decreases in foreign balances and foreign short-term investments already at New York; such transfers would involve no new import of capital. In recent years, at least, foreign deposits at New York have shown remarkable immobility; in the bulk they are apparently needed by foreigners for current and prospective dollar-exchange dealings.

FOREIGN TRADE FLOW

Foreign Loan Factor.—Rarely have we had a better opportunity to test, at a glimpse, the supposed effect of loans upon foreign trade. In a period when our net foreign lending declined by some $470,000,000, our merchandise exports *increased* by $292,000,000 and our imports *increased* by $292,000,000. Both movements ran counter to accepted theory in such matters. This is a rather trivial observation, however, in view of the already numerous exceptions in American foreign-trade figures to the supposed rule that trade, or at least the trade balance, follows the loan. It is known that some of our gold exports during 1928 moved on a "commodity basis," the metal being acquired by foreign central banks to fortify their reserves, regardless of exchange rates at the moment. Such gold shipments, if they could be measured accurately, might be counted as American exports of merchandise—not as account-settling factors. Thus counted, they would have swollen America's favorable trade balance for 1928, and there would have been a less glaring exception to orthodox foreign-trade theory.

Gold As a Commodity.—Some part of the $308,000,000 of American gold exported to France in 1928 is known to have moved on a commodity basis. In 1928, Germany imported more than $200,000,000 of gold (much of it directly or indirectly from the United States) and borrowed $292,000,000 in the American market through securities publicly offered here; possibly there is more than a superficial relationship between these groups of transactions.

The general fact that gold, moving as a commodity, followed the loan in 1928 was mentioned in the last edition of this YEARBOOK: "Practically all of our net long-term loans to foreigners promoted the export of gold . . . rather than the export of American goods. Indeed the latter was fractionally less than during 1926 or 1927."

Foreign Exchange Factor. — Throughout most of the first half of 1928, dollar exchange was at a discount, usually at our gold-export point (as estimated). Throughout most of the first half of 1929, dollar exchange was usually at a premium, often at our estimated gold-import point. One can hardly review the two periods without looking for evidence that high dollar exchange reduced American exports and increased American imports. That maximum swing in exchange rates, all the way from one gold point to the other, was close to one per cent. So decisive a change in relative merchandise costs surely must have prevented or caused a notable total of sales in the 6 or 7 billions worth of individual transactions, with the effect, in this case, of making our favorable trade balance less in the later period than in the earlier one. We observe, however, that trade volumes rolled on as if oblivious to even this maximum fluctuation in exchange rates. There was no change at all in the trade balance; unless we count as merchandise exports in the earlier period the gold exports that moved on a commodity basis. To isolate and measure the influence of exchange rates upon foreign trade, one would need to compute a long series of coefficients, with allowances for seasonal factors, for secular trends, and for changed "detractions and promotions" in the merchandise account created by movements in other balance-of-payments items.

TARIFF REVISION AND THE TRADE BALANCE

The year closes with a special session of Congress trying to revise the tariff upward. Higher duties on American imports would, eventually, make both our imports and exports less than they would have otherwise been by precise, though unknowable, amounts. That is, our total trade would be made less than it otherwise would have been. Higher duties would definitely *tend*, also, to increase our "favorable" trade balance; for a reduction of merchandise imports tends to "promote" our various invisible imports (including our loans to foreigners) and to "detract from" all exports, including merchandise exports. In other words, there are many categories of transactions, other than merchandise exports, to help absorb the shock of reduced merchandise imports. The logic behind all this is clear and irrefutable.

CONDITIONS OF INTERNAL COMMERCE

By Ada L. Bush

Chief, Special Inquiry Section, Domestic Commerce Division, Department of Commerce

---

BASIC PRODUCTION

Record Volume of Output.—Domestic business in 1929 reached higher levels than ever before, though recessions in several lines occurred during the later months of the year. The output of manufacturing industries plays a leading part as an indicator of economic activity. It is therefore gratifying to note authoritative findings that in quantity of output the manufacturing industries during 1929 not only broke all previous records but surpassed the 1928 total of production by about 8 per cent, and rose approximately 20 per cent above the volume reported in 1923 which was regarded as an active year.

Summary for Major Group.—Automobile production for the year, as a whole, was over 27 per cent above the high record for 1928 notwithstanding the unusual decrease during closing months. A new high level of mineral production was also reached, with a similar decrease toward the close of the year. The largest production of steel in the history of the industry was reported for 1929 and copper production was higher than for the preceding year. Among other industries which showed gains in 1929 as compared with 1928 were textiles, leather and shoes, paper and printing, chemicals and petroleum refining.

Construction was the only important branch of business which reported less activity in 1929 than in the preceding year. This decrease was largely confined to new contracts for residential building and was partially offset by an increase in new construction contracts other than for residential building. The large contracts awarded late in 1928 and during the early months of 1929 resulted in a volume of actual construction in 1929 which was almost equal to that of 1928.

EMPLOYMENT AND WAGES

The increased volume of production was reflected in employment in manufacturing industry and the amount of wage payments, both of which advanced considerably in 1929. The growth of exports and the continued demands from railroads, mercantile establishments, gasoline stations, and other services were factors which contributed favorably to the employment situation. The slight downward trend of employment and payroll totals, during November and continuing into December, was generally regarded as attributable to normal seasonal conditions.

PRICES, COST OF LIVING, AND PURCHASING POWER

As was the case in 1928 there was in 1929 an absence of either a sharp decline or sudden upward movement in prices. This is another indication of commercial stability. In 1928, however, there was a moderate advance over 1927 in the general level of wholesale prices while 1929 showed a slight recession in prices, as compared with 1928. Increased industrial efficiency is held to be largely responsible for both the greater output in 1929 and for the downward tendency in prices. Though 1929 was a poor crop year for many items of agricultural production, and recessions in prices occurred in the case of some products, this was overbalanced by the somewhat higher level of farm prices in general, and reports indicate a small increase over 1928 in total agricultural income. Gains in the cost of some food items were more than offset by declines in clothing, shelter, light and other necessities, so that cost of living in 1929 ran a fraction below that of 1928. The relatively higher level of general purchasing power is indicated by factors elsewhere enumerated as characteristic of the year, and is further evidenced by a growth in the volume of imports.

CREDIT AND FINANCE

Legitimate business, with the possible exception of certain branches of the construction industry, found funds readily available at reasonable rates despite the sharp use of interest rates before the stock market crash. The Federal Reserve Banks maintained a wide spread between the rates on brokers' loans and the rates charged to business borrowers. Brokers' loans showed a marked decrease in November and in December were reported below the level of 1928. Following the security liquidation in October and November, interest rates were considerably lower than for any period during the preceding year. The financial record of 1929 was without parallel in many respects. Long-term business borrowing was largely accomplished by floating stocks on a rising market, often to retire bond issues. Dividend payments of industrial and public-utility corporations were about 20 per cent greater than in 1928. As measured by the amount of liabilities there was a decline of 7 per cent in commercial and industrial failures.

DISTRIBUTION MOVEMENT

Primary distribution, as measured by freight car loadings, increased perceptibly in 1929 and total freight ton-mileage also rose above the record for the previous year. Wholesale trade increased by about 3 per cent as compared with 1928; exports of American manufactures reached a total value of approximately $3,250,000,000 or about 9 per cent above 1928; and retail sales of department stores, mail order houses, and chain stores attained previously unknown peaks. According to preliminary reports available at this writing retail distributors found that sales of Christmas merchandise, referred to as "luxury goods," were equal to the high record of 1928. This was contrary to expectations, in view of the stock market situation, and testified to a general confidence in continued prosperity.

FACTORS IN COMMERCIAL STABILITY

The commercial record of 1929 is remarkable in the history of economic progress and the outstanding achievement of the year was a practical demonstration of the fact that American commerce and industry have advanced in scientific development to the point where a crash in the New York stock market need not result in a national business depression. None of the major industries was overloaded with goods when the break in the stock market came in November, and the explanation as to why business conditions were not seriously affected by the wave of speculation which swept the country in 1929 probably lies in the fact that production and consumption have gradually been brought into closer harmony as a result of progress in scientific marketing and greater efficiency on the part of both producers and distributors. The maintenance of a high level of efficiency in transportation service has also largely contributed to a decreased tendency toward overstocking. With plans under way to adjust automobile manufacture to such requirements as develop in 1930 and to place construction in a more favorable position through lowered money rates —thus providing for the financing of the huge program of construction which has been decided on—it would seem that there are no outstanding weaknesses to be carried over into 1930.

RAILROADS

By R. H. Aishton

President, American Railway Association

SIGNIFICANT DEVELOPMENTS

O'Fallon Case.—The historical record of the steam railroads in the United States shows for the year 1929 at least three significant events. On May 20, 1929, the Supreme Court of the United States handed down a decision with respect to what is popularly called the O'Fallon Case, which has been referred to as the "greatest lawsuit of the century." The most important question involved in this case was the value of railroad property. The Supreme Court disagreed with the Interstate Commerce Commission as to the method of determining value, declaring that the Commission had failed to give consideration to current or reproduction costs. It said: "In the exercise of its proper function, this court declared the law of the land concerning valuations for rate-making purposes. The Commission disregarded the approved rule and has thereby failed to discharge the definite duty imposed by Congress. . . . The question on which the Commission divided is this: When seeking to ascertain the value of railroad property for recapture purposes, must it give consideration to current, or reproduction, costs? The weight to be accorded thereto is not the matter before us. No doubt there are some, perhaps many, railroads the ultimate value of which should be placed far below the sum necessary for reproduction. But Congress has directed that value shall be fixed upon a consideration of present costs along with other pertinent facts; and this mandate must be obeyed."

The Railroads in Aviation.—During the year the steam railroads have not only more definitely and extensively entered into the field of motor bus transportation but a number of the carriers have also entered upon a definite program of coördinating their services in the transportation of passengers with airplanes. The year 1929 marks the date when the steam railroads have definitely entered aviation.

Coöperation Among Carriers.—During the wheat harvesting season of 1928 there occurred a greatly increased use of the combined harvester-thresher machine in the harvesting of wheat. The result was the pouring of a torrent of grain into the markets. This placed a most unusual strain not only upon existing elevator capacities but also upon the transportation facilities of the railroads. Certain carriers serving particularly the Southwestern and Middlewestern regions were almost deluged with this torrent of grain. It was not possible for them to handle it with the facilities which they had at their disposal. They called, therefore, upon other railroads, by direct request and through the Car Service Division of the American Railway Association, for additional cars suitable to handle grain. There was immediate response from other carriers and upward of 20,000 cars were diverted to the rail lines most needing assistance. The picture presents the most striking instance of the coöperation between rail carriers for meeting the demands of the public for transportation service that has recently occurred.

RAILROAD FACILITIES

Mileage.—The average miles of road operated by Class I steam roads in the United States (Class I carriers are those whose gross incomes are $1,000,000 or more), excluding switching and terminal companies, was 238,000 in 1927 and 240,151 in 1928. The total track mileage of all railways in 1927 was 424,738 miles and in 1928 was 426,000 miles. Class I carriers of the country operate about 91 percent of the total mileage of the country and, due to the long haul service which they perform, earn about 97 percent of the total revenues.

Passenger Cars and Locomotives.—Class I railways in 1927 had in service 53,822 passenger train cars and in 1928, 53,097. The number of locomotives in service on Class I railways in 1927, was 61,363, and in 1928, 59,391. While in actual number the locomotives in service have decreased, the tractive power per unit and the total tractive power have increased. This increase in tractive power has characterized the steam locomotives for many years. In 1911 the average tractive power of steam locomotives was 28,305 pounds. The average in 1927 was 42,798. In 1928 the average tractive power had increased to 43,845 pounds.

Freight Cars.—From 1911 to 1925 the actual number of freight cars owned by Class I railways in the United States steadily increased. The total number of these cars in 1911 was 2,117,644. In 1925 the number was 2,357,234. The year 1925, however, marks the peak of ownership as to number of cars. Since that date there has been a steady decrease in the number of such cars as shown by the table below:

Year	Number of Cars
1925	2,357,234
1926	2,348,679
1927	2,324,834
1928	2,297,677

While there has been this decrease in the number of freight car units, there has been at the same time an increase in carrying capacity per unit. For example, the average capacity per car in 1925 was 44.8 tons. In 1928 the average capacity was 45.8 tons. It thus appears that the older type smaller capacity freight cars have been replaced by new equipment of greater unit capacity.

RAILROAD FINANCES

The total property investment in road and equipment of Class I railways, excluding switching and terminal companies in 1927 was $23,789,732,840. In 1928 the total property investment was $24,260,251,532.

Gross capital expenditures of the railways during the past six years have aggregated more than five billions of dollars. The total for 1928 was $676,665,000. Unexpended authorizations of capital expenditures were brought over from 1927 into 1928 amounting to $318,516,000. Additional authorizations of $749,182,000 were made during 1928. This was a grand total of $1,067,698,000 of authorized expenditures under way during that year. The capital expenditures of 1928 were assigned in the proportions of $224,301,000 to equipment and $452,364,000 to roadway and structures.

For the past six years capital expenditures averaged about 48 percent to equipment and 52 percent to roadway and structures.

Employment.—The number of employees on Class I railways, excluding switching and terminal companies was 1,735,105 in 1927 and 1,656,686 in 1928. The total amount of compensation to these employees in 1927 was $2,910,182,848 and in 1928 was $2,827,590,471. The average hourly compensation per employee was $0.644 in 1927 and $0.656 in 1928. The average annual earnings per employee in 1927 were $1,677.24 and in 1928 were $1,706.78.

TRAFFIC

Freight.—The total freight revenue received by Class I carriers, exclusive of switching and terminal companies was $4,632,321,165 in 1927 and $4,680,455,593 in 1928. For the nine months ended September 30, 1929, the freight revenues of Class I roads, including large switching and terminal companies, were $3,617,466,185, as compared with $3,421,198,077 in 1928, marking an increase of 5.7 per cent. The average receipts per ton mile in 1927 were 1.080 cents and in 1928, 1.081 cents. The average length of haul was 181.39 miles in 927 and 183.31 in 1928. The total revenue tons carried by Class I railways in 927 were 2,363,638,942 and 2,361,622,636 in 1928. The revenue ton miles of these carriers in 1927 were 428,736,961,993 and in 1928 were 432,915,184,526. Carloadings of revenue freight were 51,635,806 in 927 and 51,576,731 in 1928. The average load per freight car was 27.2 tons in 1927 and 26.7 tons in 1928.

Passenger.—The total passenger revenues of Class I railways, excluding switching and terminal companies, were $974,950,863 in 1927 and $901,018,801 in 1928. The average revenue received from each passenger on the basis of the individual railway was $1.17 in 1927 and $1.14 in 1928. The average journey per passenger on the basis of the individual railways was 40.55 miles in 1927 and 39.99 miles in 1928. While the revenue passenger miles have declined until in 1928 they were lower than for any year within the past twenty years, the aggregate total of revenue passenger miles is impressive. In 1928 there were 31,601,341,798 revenue passenger miles made on Class I railways, representing a decrease of 33 percent below the total for 1920. The total number of passengers carried by Class I roads was 829,917,845 in 1927 and 790,327,447 in 1928.

Transportation Service.—The rail carriers continue to receive commendation from the shippers of the country for the high level of transportation service afforded. The annual report of the Secretary of Commerce for 1928 says: "The most conspicuous aspect of railway transportation during recent years has been the steady improvement in the quality of the service rendered. Especially important is the fact that cars have been made available promptly when needed. The chronic shortages which were characteristic of the war years and those immediately following have been wholly done away with. Equally beneficial to the shippers and receivers of freight and indirectly to the consumers of commodities has been the gain in the rapidity of transportation and delivery. It is estimated that the time required for a given shipment is now at least one-third less than at the close of the war. This improvement in railway service has reduced the costs and risks of industry and of distribution. It has made it possible to do business without carrying excessive stocks of commodities."

Service Factors.—This high level of transportation service is due primarily to the large expenditures of capital which the carriers have made during recent years. A second important factor is the coöperation among carriers themselves and between shippers and carriers. The result has been that car shortages are considered to be a thing of the past. The millions of cars, however, are not distributed to serve the particular needs of individual shippers everywhere in this broad country without planning and foresight and without someone being constantly in touch with the requirements.

Service Coöperation.—For more than six years there has been coöperation between shippers and carriers in the matter of car service by means of a system of Shippers Regional Advisory Boards. There are thirteen such boards, with a membership of more than 15,000. The extraordinary demand for box cars to handle wheat has been referred to. In addition, there has been an unusual demand for open top cars. The tonnage of coal was heavy, as was likewise the tonnage of sand and gravel for road construction and cement. The coöperation of carriers with carriers and of shippers with the carriers, particularly in the matter of heavier loading, has enabled the railroads to meet these unusual demands. Despite the decrease in passenger revenues the railroads have maintained a high grade of excellent passenger service. A few of the carriers have been able to discontinue operation of certain passenger trains rendered unprofitable by the keen competition of motor vehicles on improved highways.

REVENUES AND EXPENSES

Total operating revenues of Class I roads, excluding switching and terminal companies was $6,136,300,270 in 1927 and $6,111,735,511 in 1928. For the nine months ended Sept. 30, 1929, total operating revenues of Class I roads, including large switching and terminal companies were $4,775,112,965 as compared with $4,541,847,582 for the same period in 1928. This marks an increase in total operating revenues of 5.1 per cent.

Total operating expenses of Class I railways, excluding switching and terminal companies for 1927 were $4,574,177,821 and $4,427,995,036 in 1928. For the nine months ended Sept. 30, 1929, total operating expenses for Class I roads, including large switching and terminal companies were $3,414,375,651 as compared with $3,346,368,629 in 1928, making an increase of 2 per cent.

Net operating income for Class I railways, excluding switching and terminal companies, was $1,067,985,495 in 1927 and $1,172,864,100 in 1928. For the nine months ended Sept. 30, 1929, the net railway operating income of Class I railways, including large switching and terminal companies, was $960,078,700, as compared with $820,572,952 in 1928, or an increase of 17 per cent.

Operating ratio for Class I railways, excluding switching and terminal companies was 74.54 per cent in 1927 and 72.45 per cent in 1928. For the nine months ended Sept. 30, 1929, the operating ratio of Class I railways and large switching and terminal companies was 71.50 per cent as compared with 73.68 per cent in 1928.

Taxes.—The railway tax accruals for Class I railways, excluding switching and terminal companies for 1927 were $376,110,250 and for 1928 were $389,432,415. For the nine months ended Sept. 30, 1929, tax accruals of Class I railways and large switching and terminal companies were $310,914,371, compared with $286,695,002 in 1928, an increase of 8.4 per cent. Of this amount Class I roads paid in taxes to the Federal Government for income and other taxes $86,031,418 in 1927 and $89,277,354 in 1928.

Investment Return.—The rate of return on investment in road and equipment of Class I railways, (excluding switching and terminal companies) including materials, supplies and cash on hand for 1927, was 4.30 and for 1928, 4.65 per cent.

SUPPLIES AND MAINTENANCE

Fuel and Material Purchases.—The railways of the United States represent one of the largest customers of the basic industries of the country. They buy annually about 25 percent of the total bituminous coal production in the United States, and, in addition, about five percent of the total anthracite coal production. Their further fuel requirements include approximately 18 percent of the total fuel oil output. They purchase directly about sixteen percent of the total annual timber cut. They consume about sixteen percent of the total iron and steel output of the country. The fuel bill of Class I railways for 1928 amounted to $384,608,000. Their purchases of forest products equalled $160,794,000; of iron and steel products $397,544,000, and of miscellaneous materials

$328,395,000. The grand total of their purchases for 1928 was $1,271,341,000.

Maintenance Expenditures. — The total expenditures by Class I railways, excluding switching and terminal companies, for maintenance of way and structures in 1927 were $868,581,432 and for 1928 were $837,905,747. The total expenditures of these same carriers for maintenance of equipment were $1,219,051,528 in 1927 and $1,166,941,920 in 1928.

Motive Power.—Beginning with 1923 the concerted efforts of the railways to improve the condition of their motive power began to show definite results. The percentage of unserviceable freight locomotives has been reduced almost successively each year since 1922. In that year the average number of freight locomotives in bad order, that is, unserviceable, was 25.5 per cent. In 1928 the number of locomotives in bad order was 16.3 per cent.

Freight Car Condition.—There has been likewise a continued improvement in the condition of freight cars. In 1921 the number of freight cars on the lines of Class I railways in unserviceable condition was 13.1 per cent, in 1922, 12.8 per cent, in 1923, 8 per cent and in 1928, 6.2 per cent. As of October 15, 1929, the number of freight cars in bad order was 5.8 per cent and of locomotives in unserviceable condition 14.5 per cent.

RATES

There were no major changes in freight rates during the year 1928. As in the previous year numerous minor adjustments of a local character, mostly downward, were made. The Interstate Commerce Commission has continued its investigation into the freight rate structure under the Hoch-Smith Resolution. Hearings have been concluded with respect to the rates on grain in the Western District and for export and on the rates for livestock. Arguments have been made and briefs filed with respect to these two problems. No decision has yet been rendered. Consideration of this resolution continues to attach itself to every important rate consideration that appears before the Commission. The records that have been accumulated as a result of these extensive investigations are most voluminous.

TRANSPORTATION COMPETITION

Motor Buses and Trucks.—The competition of motor vehicles with rail carriers continues to intensify and extend itself as the highways are improved. In 1928 there were 22,600 companies operating buses. In 1929 this number had increased to 23,300. The total number of buses operated in 1928 was 86,700 and in 1929 was 92,400. It is reported that all common carrier motor buses traveled 1,528,000,000 miles in 1929. The number of passengers carried by common carrier buses was estimated for 1928 to be 1,220,000,000, and for 1929 to be 1,408,000,000. The number of motor trucks registered in 1928 was 3,113,999. Registration for passenger cars in 1928 was 21,379,125. The total miles of surfaced highway in 1928 were 588,721, which had increased in 1929 to 615,000. There were 62 carriers, either directly or through subsidiaries, operating buses in 1929. It is estimated that these companies operated 1,256 buses in that year over 16,793 miles of route. Seventy railroads were making use of motor trucks in 1928, either directly or through subsidiaries or by contract.

The Inland Waterways Corporation, which is a government owned, subsidized and operated barge line, extending from Birmingham, Alabama, *via* Mobile, New Orleans and St. Louis to the Twin Cities, has expended a portion of its increased capitalization for new equipment. As a result of a decision by the Interstate Commerce Commission, the rail carriers are establishing through routes and joint rates from an extended territory with this barge line.

New air mail routes have been established during the year with an increase in the amount of mail and express handled by airplane. The government reports a loss of $10,000,000 for the year 1928 on its contracts with airplane carriers for handling mail.

RAILROAD CONSOLIDATION

No important Federal legislation was enacted during the year with respect to the regulation of rail carriers. A bill providing an enabling act that will permit voluntary consolidation of rail carriers, upon the certificate of the Interstate Commerce Commission that such consolidation would be in the public interest, is pending before the present session of Congress. It is reported that the Interstate Commerce Commission will promulgate a final plan for the consolidation of all carriers by the beginning of the year 1930, thus fulfilling the provisions of the present law with respect to consolidations.

Meanwhile, under the provisions of the present law, paragraph 2 of Section 5, which permits leases and stock control by one carrier of other railroad properties, so-called consolidations have been going forward. The New York Central Lines has secured approval from the Commission of its program under this provision. Other important lines have presented plans to the Commission for extensive unification also under this provision, such as the Baltimore & Ohio, the Wabash and the Delaware & Hudson. The Commission has granted approval to the Chesapeake & Ohio for lease of the Pere Marquette.

HIGHWAYS AND MOTOR ROADS

By Thomas H. MacDonald

Chief, Bureau of Public Roads, Department of Agriculture

RURAL ROADS

Mileage.—According to the best available estimates there were 3,016,281 miles of public roads in the United States on January 1, 1929. This mileage includes roads of all classes outside the limits of municipalities, and is made up in very large part of local roads of small importance, many of them mere right of ways established by law along each section line in the States of the Middle West. The roads which accommodate by far the greater part of the rapidly-growing traffic of motor vehicles are comparatively limited in mileage and, in the main, are included in the Federal-aid or state highway systems, although the more important county and local roads, especially in metropolitan areas also accommodate a very considerable and growing traffic.

The Federal-aid system which includes, as a whole, the roads of highest traffic importance was designated jointly by the Federal and state highway authorities following the passage of the Federal Highway Act in 1921. This system, which is limited by law to 7 per cent of the total highway mileage of record at the time the law was enacted, on June 30, 1929, included 188,857 miles, a mileage which may be increased under provisions of the law to approximately two hundred thousand miles by future designations.

State Roads.—In most instances the roads selected for inclusion in the Federal-aid system have also been designated by the states as units in the several state highway systems, but these latter systems are the more extensive, including in addition to the Federal-aid sections others which are not included in the Federal scheme. In the aggregate these systems of the states included 306,442 miles on January 1, 1929.

County and Local Roads.—All roads not included in one or the other of the foregoing main systems are county or local roads, and with few exceptions are of less importance than Federal-aid and state roads. The mileage of roads of this general class on January 1, 1929, was approximately 2,709,839 miles.

ROAD IMPROVEMENT

Federal Aid.—All roads included in the Federal-aid highway system are eligible for improvement with Federal monetary aid. The improvement is carried out under the immediate direction of the state highway departments subject to the approval of the Federal Bureau of Public Roads, acting for the Secretary of Agriculture, who is charged with the administration of the Federal Highway Act, and any amount not exceeding 50 per cent of the cost, or $15,000 per mile, may be paid by the Federal Government. On Sept. 30, 1929, the roads of this system which had been improved with Federal assistance reached a total of 79,494 miles, and on the same date other roads aggregating 10,315 miles were under construction, and 2,165 miles had been approved for construction in the immediate future, making a total of 91,974 miles already improved or in course of improvement with Federal aid.

Joint Financing.—As roads included in the Federal-aid system are also improved by the states without Federal assistance, and as the mileage thus improved is approximately equal to that jointly financed, the improved portions of this, our major highway system, now totals nearly 90 per cent of the total designated mileage, and approximately 65 per cent of the entire mileage is surfaced with materials varying, according to the needs of traffic, from mixtures of sand and clay constituting so-called sand-clay surfaces to the most durable types of pavements.

State Improvement. — The state highway systems which, as previously stated, are coincident with, but more extensive than the Federal system, are improved as a whole, to nearly the same degree. On January 1, 1929, the total of the 306,442 miles then embraced in these systems included 31,755 miles improved by grading and draining, and 193,138 miles of surfaced highways, the types of surfacing varying, as in the case of the Federal-aid system, from sand-clay to durable pavements.

County and Local Road Work.—The latest available statistics of county and local roads are those of January 1, 1929. On that date, as previously stated, there were approximately 2,709,839 miles of such roads, of which 432,999 miles or approximately 16 per cent were surfaced, and 507,839 miles were improved by grading and drainage only.

TYPES OF SURFACED ROADS

In each of the systems mentioned the surfaced roads are of various types, of which the principal are sand-clay, gravel, water-bound and bituminous macadam surfaces, and sheet asphalt, bituminous concrete, Portland cement concrete, and brick and other block pavements. Of these several types, the sand-clay, gravel and water-bound macadam with the unsurfaced but graded and drained roads are frankly regarded as temporary or transitory, to be replaced by a more durable type when traffic reaches a sufficient value to require and justify such replacement. The other types—bituminous macadam, sheet asphalt, bituminous concrete, Portland cement concrete, and brick and other block pavements—are classified as durable, and are suited to the needs of heavy motor traffic.

According to the latest available statistics for each of the three general highway systems, previously mentioned, the surfaced roads of the Federal-aid system are classified as 63 per cent temporary or transitory and 37 per cent durable; those of the state systems are similarly classified as 70 per cent transitory and 30 per cent durable; and a similar grouping of the county and local roads includes in the temporary classification all but 10 per cent of the total. This classification serves to indicate as accurately as is possible, perhaps, the relative degree of improvement of the three systems.

In the table (p. 441) the total, 3,016,281 miles of road in the country, segregated as of the state and local systems, respectively (the former including the Federal-aid system) is classified by type of surface, as of January 1, 1929, the most recent date for which the complete statistics are available.

ROAD CONSTRUCTION AND MAINTENANCE

Mileage Built.—During 1928 there was a total of 74,783 miles built on the State and local road systems,

CLASSIFICATION OF HIGHWAYS BY TYPE

January 1, 1929

Type	State Highways	Local Roads	All Highways
	(Miles)	(Miles)	(Miles)
Unimproved and partly graded	81,549	1,769,001	1,850,550
Graded and drained	31,755	507,839	539,594
Sand-clay and topsoil	13,499	74,562	88,061
Gravel, treated and untreated	93,124	277,797	370,921
Water-bound macadam, treated and untreated	18,142	46,454	64,596
Bituminous macadam	15,200	14,953	30,153
Sheet asphalt	1,498	1,472	2,970
Bituminous concrete	5,392	3,763	9,155
Portland cement concrete	42,957	12,317	55,274
Brick and other block pavements	3,326	1,681	5,007
Totals	306,442	2,709,839	3,016,281

of which the surfaced portions amounted to 50,465 miles. Of these totals 29,252 miles, including 20,577 miles of surfaced roadways, have been constructed by the states with and without Federal aid, and 45,531 miles, of which 29,888 miles have been surfaced, have been built by the county and local governments. The Federal-aid road construction during the fiscal year ending June 30, 1929, totaled 9390 miles including 7052 miles of surfacing.

Total Expenditures.—Since 1921 the annual expenditures for all rural road construction and maintenance have exceeded $1,000,000,000, a large and increasing proportion of which is provided by the taxes levied on motor vehicles and motor fuel. Large as it is, this expenditure is only one-half of the annual expenditure by owners of motor vehicles for gasoline alone. In this fact there is a suggestion of the reason for the public approval and economic wisdom of the highway expenditures, since the money thus invested results in a reduction of the cost of gasoline and other operating expenses of motor vehicles which demonstrably exceeds the expenditure.

State And Local Expenditures.—In 1928, the most recent year for which complete statistics are available, the expenditures of the state highway departments (including Federal aid) amounted to $827,549,983; those of the counties and other local governments were $832,142,007. These expenditures are classified according to their purpose as follows:

By state highway departments:	
Road and bridge construction	$536,294,303
Road and bridge maintenance	158,878,573
Interest and principal on bonds	64,653,533
Equipment and miscellaneous	67,723,574
Total	$827,549,983
By counties and other local governments:	
Road and bridge construction	$282,314,715
Road and bridge maintenance	259,753,188
Interest and principal on bonds	183,088,622
Miscellaneous purposes	106,985,482
Total	$832,142,007
Grand Total	$1,659,691,990

USAGE OF ROADS BY MOTOR VEHICLES

Annual Motor Travel. — During 1928, according to information received from the states, the consumption of gasoline by motor vehicles amounted to approximately 12,000,000,000 gallons and it is estimated that the total for 1929 will exceed 14,000,000,000 gallons, which at 12 miles per gallon (the approximate average consumption by vehicles of all makes and types) would indicate that the annual travel by motor vehicles amounts at present to over 168,000,000,000 vehicle-miles, an almost inconceivable figure. Yet large as it is it must be more than doubled to obtain a measure of the passenger-mileage for which the automobiles and improved roads and streets are responsible. This tremendous annual passenger movement by highway passed the rail movement some years ago and is now approximately 9 times as great.

Numbered United States Highways.—Of special interest to all owners of motor vehicles is the network of principal interstate and transcontinental highways, known as United States highways, designated in 1925 by agreement between the highway authorities of all states and the Federal Government. There are approximately 96,000 miles of such highways comprising the most direct and feasible interstate and transcontinental connections, and a plan has been adopted and is being rapidly put into effect, whereby the routes which compose this important network will be uniformly designated by numbers. In this system, which is made up of the most important sections of the Federal-aid and state systems, there are approximately 180 routes, and each route is being marked, throughout its entire length in all states traversed, by the same distinctive number, displayed on a white shield-shaped marker. All east-and-west routes are being designated by even numbers, the more important in multiples of 10, as 10, 20, 30, etc. The north-and-south routes are being designated by odd numbers, and the more important of these roads are being indicated by two-digit numbers ending in one or five, as 11, 15, etc.

Direction and Warning Signs.—For the guidance of travelers all of these routes are being marked with standard direction and warning signs, which are readily distinguishable by their shape and color as well as by the warning and information printed upon them, and they thus indicate at a glance the nature of the danger to be avoided or the character of the information they carry. All danger and warning signs are composed of a yellow background with black lettering. They are made in four shapes indicative of different degrees of danger. Thus, an octagonal sign is used to give warning of such extreme danger as to require a complete stop. A round sign is posted at all railroad crossings. Diamond-shaped signs give notice of such dangerous conditions as curves, steep grades, narrow bridges, etc.; and square signs are posted at points of occasional danger such as approaches to schools, churches, hospitals, etc. All directional and informational signs will be white with black lettering, and all will be rectangular in shape. Those calling attention to legal speed limits will be in the form of a vertical rectangle; all others will have their longer dimension horizontal. These route markers and signs are now in the course of erection. In 18 states their placement has already been completed, and in another 16 states the work is more than 90 per cent completed. As rapidly as possible this important and useful work in the interest of safe and expeditious travel will be carried out in all the states of the union.

MOTOR BUS SERVICE

By Carl W. Stocks

Editor, *Bus Transportation*

SERVICE EXTENSION

Operation Development.—Much of vital importance has taken place in the field of motor bus transportation in the past year. A decade ago buses were ranked among the fads; in the recent years they have attained a position of national importance. It is possible to reach practically every city in the country, using the bus as the sole means of transportation. All-night riding in specially designed buses has become established in many parts of the country. Interstate regulation of buses is again in the process of becoming law, and there is every reason to believe that before the year is out unrestricted interstate operation will be curbed.

Buses and Mileage.—With respect to the increase in bus operation during 1929, it is conservatively estimated that a total of more than

97,000 buses are now in operation. This total includes buses in all classes of service. This compares with 92,000 in 1928, 86,000 in 1927, 80,000 in 1926, 65,500 in 1925, and 35,000 in 1924. In 1927 and 1928 there was a gain of 6000 buses each year. Reported deliveries for 10 months during 1929 from seven leading chassis manufacturers have been ahead of the preceding year, month for month. There are more miles of fixed bus routes than there are miles of concrete highways and also, more miles of routes than there are miles of steam railroad tracks.

Routes.—Fourteen departures daily are made from the West Coast and a similar number from the East on transcontinental schedules, whereas the first transcontinental bus arrived in New York in October, 1928, making the trip in five days and fourteen hours. The Pennsylvania Railroad is running half-hourly service between New York and Philadelphia. The largest bus operator in the country is the Public Service Coördinated Transport, Newark, N. J., which is operating 2400 buses and transporting 312,000,000 passengers yearly. By far the majority of these buses is in city service, although both intercity and interstate service is rendered. There is also the beginning of a trend for bus companies to purchase competing traction companies. This has actually happened in a number of intances. Night service provided by buses with sleeping berths has been instituted successfully, both on the Pacific Coast and between Buffalo, N. Y., and Cleveland, Ohio. Further progress will likely be made during the current year.

The Northland Transportation Company, a subsidiary of the Great Northern Railroad, sold its franchise and equipment to Motor Transit Management Corporation, operating the Greyhound system, for $2,500,000, involving 200 buses and 3300 miles of route. The Union Pacific Railroad instituted cross-country service from Los Angeles to the East through an interline agreement with a line running eastward from the Mississippi River. Motor Transit Management Company has purchased three important companies in Texas for $1,150,000. It is a comparatively simple matter to travel now from Portland, Me., to Los Angeles, Cal., or from Portland, Ore., to Miami, Fla., by bus with a minimum number of changes and on one ticket.

Holland Tunnel.—As this is being written, the statistics covering the second year's operation of the Holland Tunnel connecting New York City and Jersey City, N. J., under the Hudson River have been released. Of the 10,766,351 vehicles using the tube, a gain of 26% over the previous year's operation, more than 330,000 were buses. This is a gain of 60% over the first year. The tunnel authorities declare the greatest advance was shown in the use of the tube by buses.

COMPANY OWNERSHIP

Mergers.—Outstanding in the year's events in bus transportation has been the series of strengthening mergers with, or transfers of ownership to, more powerful companies. These activities have brought much of the state-wide, sectional or transcontinental services under far-reaching, efficiently managed and properly financed organizations.

Acquisition by Railroads.—Another feature of the year has been the number of railroads buying into independent bus systems. The most notable of these developments occurred early in the summer, involving the largest independent bus system in the country and three leading railroads. This merging of interests resulted in the formation of a $30,000,000 organization divided into three groups: Pacific Transportation Securities, Inc., on the West Coast; Pickwick-Greyhound Lines, covering the central portion of the country, and Motor Transit Management Company, controlling the Greyhound Lines, running eastward from Chicago. Besides the several independent bus companies involved in this deal, the Pennsylvania, Great Northern and Southern Pacific Railroads are interested financially as well as in active operation. Between 2000 and 3000 buses, covering a daily schedule of over 200,000 miles, on 30,000 miles of route and carrying yearly 10,000,000 passengers more than 73,000,000 miles, were involved. Hardly a week has passed during the year that there has not been one or more important consolidations or purchases.

Results of Consolidation.—The effect of this activity on the future of the industry is apparent. In consolidation there should be increased strength through better purchasing power and higher grade management, hence a greater profit. In these activities the bus companies have followed the examples of other big businesses, —a merging of interests, experience and capital for the mutual benefit of the public and owners. As more railroads acquire substantial holdings in the independent companies, the question naturally arises as to how long it will be before they gain complete control of the independents to do with as they will. Assurances have been set up, however, that the nationwide independent systems, which have been combined and which were really the pioneers in transcontinental highway service, will retain their independence so far as operation and future progress is concerned.

RAILROAD BUS OPERATION

Steam Railroads.—Remarkable expansion in the operation of buses by steam railroads has taken place during the past year.Whereas 62 railroads operated 1256 buses as of January 1, 1929, it is estimated that now more than 70 railroads operate buses either in their own name or through controlled subsidiary companies, and this does not include independent bus companies in which the railroads merely hold a minority stock interest. Railroads are using approximately 2300 buses on close to 20,000 miles of route. Since 1928 this represents an increase of 1300 buses. Six railroads are operating fleets of more than 100 buses. In the light of this expansion it would seem permissible to say that steam railroads are taking advantage of the unique services rendered by buses and are applying them to their own service in the form of augmented long haul operation, feeders to main line trains from districts without rail service and as substitutions for unprofitable train operation.

Management.—In a study of the details of railroad bus operation it is worthy of mention to point out that in their acquisition of independent bus lines, the railroads are retaining the previous owners as operating managers. This arrangement, it has been pointed out by active observers in the industry, indicates an exemplary move to retain experienced bus men rather than attempt something alien to their own experience and practice.

Electrical Railroads.—Rapid strides also have been made during the year in the operation of buses by electric railway companies, either directly or through controlled subsidiaries. It was estimated in September, 1928, that 312 companies operated 9262 buses in conjunction with trolley service, not including 52 companies operating 359 buses exclusively. Total estimates made as recently as September, 1929, by the American Electric Railway Association put the figure at 307 companies, operating 11,402 buses over 20,300 miles of route, not including 54 former traction companies that have completely changed their operating units from cars to buses. These 54 companies operate 458 buses on 1716 miles of route.

GROWTH OF BUS TRANSPORTATION

Population Shifts.—Since the Census of 1920 was taken there has been a distinct redistribution of population. The trend has been from the smaller to the larger cities and in the larger cities, especially those of 100,000 or more, there has been a further shift of residence population to adjacent suburbs. Factors influencing this redistribution are improved transportation facilities, growth in ownership of private automobiles and the higher standard of living to which the neighborhood surroundings of factory sites are not conducive, thus the suburban shift. Not only do all of these migratory changes in local population vitally affect local transportation agencies, but it may be said impartially that the growth of bus transportation in the past ten years has been as vital a factor in this trend as any other which may be introduced.

City Growth.—Statistics showing the population changes since 1920 indicate that the number of cities has increased from 761 to 1032. There are twice as many cities with more than 1,000,000 population; the 100,000 to 1,000,000 group has increased from 65 to 84, while the smaller cities with 100,000 or less now number 942 as compared to 693.

Use of Buses in Cities.—During the past year a survey undertaken by the staff of *Bus Transportation* indicates the growth of local bus transportation. The study is not yet near completion, but some rather interesting facts already stand out that are worthy of mention. In 1922 it was a rare condition to find cities being served exclusively by bus. The number could be counted on the fingers of both hands. In fact, there were only fifteen cities which had any bus service at all. All had less than 70,000 population and only two had a population of more than 25,000. The combined population amounted to only 296,600. Compare this with conditions found on Sept. 1, 1927, when 186 cities had no other organized transportation than bus facilities to serve a combined population of 3,700,000. On the other hand, the total number of cities having some bus operation has gone ahead with rapid strides. In the period 1922-1929 bus operation has been established in 351 cities with the result that to-day buses are found doing local work in 52.7 per cent of the 1032 cities in the country with more than 10,000 inhabitants.

City Bus Control.—In connection with the development and growth of the number of all-bus cities, it is of interest to note that notwithstanding intercity bus lines are under control in 47 states and the District of Columbia, this is not true so far as city-wide bus systems are concerned. In 27 states, local bus operation still remains under the supervision of the city served. Home rule now applies in 446 cities out of the total of 1032. Generally speaking, there is a tendency toward one-man control of bus operation in cities with less than 15,000 population and toward independent, incorporated companies in cities of 15,000 to 25,000. In the cities with a population of 25,000 to 50,000, there is not the same marked tendency toward control.

ELECTRIC RAILWAYS

By John A. Miller, Jr.

Managing Editor, *Electric Railway Journal*

GENERAL

Continued improvement was noticeable in the economic condition of the electric railways in 1929. No marked change occurred in the size of the industry, except in connection with coördinated bus operations which were greatly expanded. While the volume of traffic remained practically the same as in 1928, the average fare was slightly higher, resulting in increased gross revenue. On the other hand, operating costs were somewhat reduced. This was due primarily to the use of more efficient methods and equipment, as material and labor costs showed little variation from the preceding year. Much interest was shown in rapid transit projects in various cities, but comparatively little new mileage was added. Labor conditions have been stable, with only one serious strike during the year.

ELECTRIC RAILWAY STATISTICS

Classification.—Physical statistics of the urban and interurban electric railways in the United States are presented in a table at the end of this article, together with certain data for the electrified steam railroads. No definite line of demarcation can be drawn as some electrified steam railroads render service that is essentially the same as that of the interurban electric railways and vice versa. The classification made here is that commonly accepted by the industry.

Number.—In 1929 there was a slight decrease in the total number of urban and interurban electric railways, due to the complete abandonment of a few small systems. Among these were the railways in Burlington, Vt., Enid, Okla., and Santa Barbara, Calif. Some consolidations also occurred during the year, the outstanding example being the consolidation of the surface lines of the Brooklyn City Railroad and the Brooklyn-Manhattan Transit Corporation, united under the name of the Brooklyn and Queens Transit Corporation.

Mileage.—A slight decrease occurred also in the total track mileage operated. The loss due to the abandonment of railways was inconsequential as these systems were all small. A more important reason for the decrease was the suspension of service on numerous unprofitable or unnecessary lines belonging to railways which continued to operate the remainder of their lines. The trend during 1929 was the continued substitution of bus service in place of car service on light traffic lines. While the net decrease in track mileage since 1918 has amounted to nearly 9½ per cent of the total electric railway mileage of the country, the individual abandonments have been small. The average size of the systems entirely abandoned was less than ten miles, and the average population which they served was about 10,000.

Extensions.—During 1929 a considerable number of extensions were made to existing rail lines. Outstanding among these projects were the beginning of work on a 35-mile electric railway between Point Isabel and San Benito, Tex. and a 28-mile extension of the Oregon Electric Railway. Smaller extensions were made in Milwaukee, Seattle, and elsewhere.

Buses.—In conformity with the trend toward the use of buses on light traffic lines the electric railways added more than 2,000 such vehicles to their fleets and materially increased the total mileage of their bus routes. At the same time, there was more extensive use of buses to render a type of service different from that given by the rail lines. A notable increase occurred in the number of de luxe and express lines operated at a rate of fare higher than that of the ordinary service.

Cars.—The number of cars operated by the electric railways remained fairly constant. A few large car orders were placed, including 300 for the Interborough Rapid Transit Company in New York, 100 for the Chicago Surface Lines, 100 for the Brooklyn & Queens Transit Corporation and 100 for the Department of Street Railways of Detroit. At the same time a considerable number of old cars were permanently retired from service, so that the total for the industry showed little change.

CAR DESIGN

"Automotive" Truck.—Several radical innovations were made in car design in 1929. The first was the so-called "automotive" type truck with small, high-speed, electric motors mounted longitudinally instead of crosswise to the car and connected to the axle through flexible propeller shafts instead of the ordinary gears and pinions. Another novelty is the use of disc brakes on the armature shaft in place of wheel brakes. By these means a substantial reduction has been made in unsprung weight. Although experience does not justify a definite forecast of the future of this type of truck it has been received with marked favor by the railways. Another development for reducing unsprung weight was a truck so designed that the motors are mounted on the under side of the car body. In this design the motors are connected to the axles through flexible propeller shafts. This truck is generally regarded as being still in the experimental stage.

Use of Aluminum.—Increasing use of aluminum in car construction was evident in 1929. In an experimental car built for the Pittsburgh Railways, aluminum reduced the total weight to approximately 643 lbs. per passenger seat. In a somewhat larger car built for Detroit, the weight was reduced to 624 lbs. per passenger seat. In the car referred to with motors mounted on the under frame instead of the truck, the weight per passenger seat is only approximately 515 lbs.

Foot-control apparatus for both motors and brakes was another interesting development in car design. While this type of control had been introduced on a limited scale in previous years, the new designs brought out in 1929 embodied notable improvements. With the continuing trend toward one-man operation of electric cars, foot control is thought to have an important advantage in leaving the operator's hand free for change making and other duties.

OPERATING STATISTICS

Revenue and Costs.—Preliminary operating figures for a group of some 200 of the larger electric railway companies show a decrease of approximately 1 per cent in the number of revenue passengers carried in 1929, as compared with 1928. The average cash fare in cities of 25,000 population and over during the year increased to a little over 8.4 cents. The construction cost index, based on the year 1913, was approximately 205 at the beginning of 1929. During the spring and summer this dropped to 199 but increased again in the fall to practically the same level as at the beginning. Wages showed a slight increase during the year from the index figure of 211, based on the year 1913, to a little more than 212 at the close of the last year.

Economies.—Substantial economies were effected during 1929. One-man operation, already widely adopted, was further extended during the year. The modern rolling stock purchased in previous years continued to demonstrate its value to the industry in reduced operating costs. The substitution of bus service for car service on light traffic lines resulted in substantial savings. Further economic improvement resulted from certain measures for the relief of tax burdens. It may be said that the close of the year saw the operating companies in a better financial position than at the beginning.

Taxation.—The progress made in 1929 in securing relief from excessive taxes was a continuation of that made in previous years; nevertheless, the burden of taxation on the electric railways remains heavy, being on the average about 11.5% of gross revenue and somewhat over 40% of net revenue. In Youngstown and Toledo new franchises were granted to the railways in 1929, affording substantial relief.

Franchises.—A growing recognition is apparent that franchises enacted many years ago cannot advantageously be enforced to-day as binding contracts. Whatever the merits of the situation may be from the strictly legal point of view, it is apparent that the public suffers through poor service when inadequate fares are insisted upon merely because they are specified in a franchise. Terminable permits which offer better opportunity for modifying terms of an agreement to meet changing conditions are finding increasing favor as a solution of this problem.

RAPID TRANSIT

Few important rapid transit developments occurred in 1929. In Boston, the Cambridge-Dorchester line was extended to Ashmont. In Newark, N. J., work was begun on a rapid transit line in the bed of the abandoned Morris Canal. A large amount of work was done during the year on new subways in New York City but no new lines were actually opened for operation. Construction work was begun on the electrification of the suburban lines of the Lackawanna Railroad, which will give what really amounts to rapid transit service between New York City and towns in Northern New Jersey. A similar project was undertaken by the Grand Trunk Railway between Detroit and Pontiac, Mich.

FUTURE OF ELECTRIC RAILWAYS

A general feeling of optimism prevails concerning the future of electric railways. In small towns and in

ELECTRIC RAILWAY STATISTICS, 1929

	Number of Companies	Miles of Track	Passenger Cars	Freight Cars	Service Cars	Other Cars	Electric Locomotives	Number of Buses	Miles of Bus Routes
Alabama	10	343.50	493	17	64	....	...	13	16.84
Arizona	3	30.97	31	3	3	1	...	11	13.27
Arkansas	7	132.02	239	.....	20	13	...	30	21.60
California	27	3,430.21	4,215	3,248	399	50	95	453	540.29
Colorado	9	475.04	493	223	89	48	9	29	53.50
Connecticut	8	766.32	1,449	.....	6	5	9	221	450.20
Delaware	1	81.49	106	.....	15	....	...	25	35.00
Dist. of Columbia	5	416.98	904	26	99	29	6	128	223.34
Florida	7	218.72	405	13	31	15	...	100	90.05
Georgia	6	476.93	705	16	65	43	1	53	38.12
Idaho	1	....	.....	.....	....	....	...	6	7.00
Illinois	49	3,230.21	6,947	2,391	724	180	68	424	1,221.66
Indiana	25	2,649.14	1,847	977	398	140	26	456	1,442.68
Iowa	23	1,012.80	714	1,310	180	23	37	120	1,036.93
Kansas	15	469.99	362	76	33	12	14	75	178.94
Kentucky	7	498.34	804	24	128	19	...	159	72.90
Louisiana	8	266.59	787	2	78	177	...	52	47.75
Maine	12	472.12	356	96	103	36	3	5	25.00
Maryland	5	692.11	1,589	123	152	179	3	193	2,071.92
Massachusetts ..	24	2,662.25	4,345	53	749	146	4	590	929.61
Michigan	21	1,470.53	2,544	216	137	102	13	965	1,761.57
Minnesota	8	699.87	1,223	1	102	....	2	117	138.75
Mississippi	6	26.67	36	.....	2	....	...	18	29.10
Missouri	15	1,162.23	2,566	39	342	30	7	166	342.90
Montana	4	111.90	106	15	8	....	1	8	3.50
Nebraska	4	191.76	441	5	63	36	2	30	34.84
Nevada	...	....	.....	.....	....	....	...	.....	....
New Hampshire..	11	125.03	182	1	27	11	2	39	71.48
New Jersey	12	1,087.63	2,489	3	310	155	...	1,883	2,043.65
New Mexico	1	....	.....	.....	....	....	...	1	2.00
New York	70	4,682.13	19,722	422	1,424	110	27	739	839.27
North Carolina ..	8	321.97	219	163	39	5	17	57	39.02
North Dakota ...	3	25.40	41	.....	9	4	...	4	7.10
Ohio	48	3,296.00	4,226	759	634	292	25	890	1,702.36
Oklahoma	12	365.37	247	156	32	23	14	127	100.61
Oregon	6	723.25	692	488	131	11	24	43	59.80
Pennsylvania ...	79	3,803.56	6,866	232	909	137	5	1,045	2,750.08
Rhode Island ...	2	366.62	713	34	125	124	3	76	129.35
South Carolina ..	4	60.16	86	3	8	....	...	9	32.70
South Dakota ...	1	14.50	19	.....	2	4	...	19	32.00
Tennessee	9	452.84	682	10	60	53	3	47	373.84
Texas	23	1,075.23	1,402	44	133	49	2	303	478.62
Utah	7	476.32	312	364	57	5	10	16	84.86
Vermont	5	48.62	30	3	7	....	3	3	5.00
Virginia	11	626.44	793	19	44	52	2	258	161.06
Washington	16	896.55	1,026	450	69	38	27	186	1,154.03
West Virginia...	9	449.90	387	52	60	11	3	165	568.38
Wisconsin	15	800.37	1,249	18	43	3	9	287	1,262.65
Wyoming	1	....	.....	.....	....	....	...	9	22.00
Total	663*	41,686.58	75,090	12,095	8,113	2,271	476	10,488	22,747.12
Electrified Steam Roads †	23	3,585.48	2,533	1,430	95	....	472	299	814.60
Grand Total.	686*	45,272.06	77,623	13,525	8,208	2,271	948	10,787	23,561.72

* Includes 57 electric railway companies which operate only buses.

† Classification of electrified steam railroads is that generally adopted by the industry although a number of these roads render service which is essentially the same as that given by interurban electric railways.

certain territories served by interurban, the situation remains difficult, and it may be expected that further substitutions will be made of buses in place of cars. In the large cities, however, it is now recognized that electric railway service is essential. The private automobile, which has been considered the principal cause of loss in riding on the railways, has now created such serious congestion of traffic that many people are returning to their former habits of using public transportation facilities. Where riding is heavy it has been demonstrated that transportation can be provided more economically by rail than by bus. Despite the difficulties resulting from traffic congestion surface car lines have been able to speed up their service in a number of cities. This has been due partly to improved equipment and more efficient operation and partly to the installation of improved traffic signals and recognition that special attention should be given to the expeditious movement of mass transportation vehicles.

THE MERCHANT MARINE

By Peter Bain

Editor, *Shipping Illustrated*

SHIPPING PROGRESS AND DEVELOPMENT

General.—Remarkable progress during 1929 attended efforts on behalf of the reëstablishment of American shipping and its development as a factor in world trade and commerce. While the War gave us opportunity again to assume leadership in ocean transportation, it nevertheless found us in a great measure unready to take promptly any reasonable advantage of the offering. True, we had no end of ships as a result of feverish construction activities, but the ships were just hulls and propelling machinery,—capacity craft, slow of speed, and competitively uneconomical of operation. They were, in addition, Government-owned and, as experience since has definitely proved relative to state-owned shipping the world over, Governments are of all direct operators the least satisfactory. Even had immediate action been taken to dispose of the ship burden to private ownership, it is problematical if our merchant marine development would have been any more satisfactory than that disclosed in the 1929 record. Progress in the interval may have been slow but it has been sure and is steadily picking up momentum.

Building for Competitive Service.—Private interests and individuals as well as the Government recognized that we possessed too many ships of a kind that would never qualify for competitive post-war service. They recognized further that while other countries had surpluses, their numbers and tonnages were extremely modest compared to ours. As a way out, our Government retained the ships, and perhaps it was just as well. Developments in the interval seem to bear out such a conclusion. Steadily the Government through its Shipping Board and Merchant Fleet Corporation began to bring order out of chaos. The most unfit vessels were sold to be scrapped or otherwise disposed of as commercially valueless; regular services to all leading ports of the world were inaugurated and, with these, the American flag again took a prominent place in international trade and commerce. While this has been going on, our private shipping interests—corporate and individual—have been building up for themselves the necessary operation background; that, although lacking somewhat of the foundation of years behind it, is not now the less substantial, effective, and definite, as to competitive challenge.

Trend to Private Ownership.—In the decade or more that has elapsed, misgivings have been expressed as to the early or even ultimate realization of a recreated American merchant marine commensurate with our foreign trade needs and, as well, essential to the support of our shipbuilding and allied industries; instruments all of supreme moment relative to national defense provision and maintenance. It was noted that we were being outbuilt by other nations and, worst of all, we were being outclassed in type ships, their equipment, powering and speed. The pace set was too fast for us, burdened as we were with hundreds of more or less useless ships. We appreciated our weakness, however, and, as a result, our will to achieve came into action. Concentration on a background of essentials lacking was stimulated. We began to get the Government out of the shipping business. This of necessity has been a slow and tedious affair, and the end is not yet, nor is it very definitely in sight. Each succeeding year, nevertheless, has been marked by satisfactory progress, and 1929 has been the banner post-war year of all as regards the transfer of the American merchant marine to private ownership.

SHIPPING BOARD ACTIVITIES

Passenger Lines Sale.—While the Government has been for several years steadily divesting itself of its shipping, singly and in groups, it appeared to cling tenaciously to its premier services, passenger and freight,—the United States Lines and American Merchant Lines, operating on the North Atlantic to Great Britain, France and Germany. Prospective private owners looked upon persistent Government retention with trepidation, fearing that unless they also were let go, the realization of a privately owned American merchant marine might amount to nothing. March 21st, 1929, however, the United States Lines and the American Merchant Lines passed by contract of sale to Paul W. Chapman, investment banker and broker of New York and Chicago. Purchase price of the two Lines,—eleven ships—was $16,082,000 and, for leasehold here and abroad, $218,000. Payment of the latter sum was required in cash, while that for the ships called for 25 per cent of the price of each ship on delivery, with the balance payable in equal annual installments over a period of 15 years. Unpaid balances bear interest at 4¼ per cent payable semi-annually. The contract of sale provided guarantees for continuous operation. Change of ownership took place without interruption to the regular scheduled services of the two Lines. The last vessel, —the *Republic*—was turned over to the new owners, the United States Lines Incorporated, June 6th.

Obligations of Purchase.—An important section of the contract of sale obligates the purchasers to construct, within the continental limits of the United States, two first class vessels of high speed to be run "opposite" the Leviathan in a fast weekly mail service from New York to English channel ports. These vessels are to be of at least 45,000 tons displacement and of sufficient speed to put them in a commanding position in North Atlantic traffic. Plans and specifications for the new ships are to be submitted for the approval of the Shipping Board within a year from date of sale, and it was agreed that the vessels would be ready for operation on or before mid-February, 1932. The Shipping Board agreed that the purchaser should have the use of moneys from the Construction Loan Fund up to 75 per cent of the construction cost of the vessels at the low borrowing rates provided by the Jones-White Law.

Shipping Board Construction and Acquisition.—In order to outline the principal events leading up to the situation as it existed June 30, 1929, it should be stated that the Shipping Board constructed 2,314 vessels of all sorts, in addition to which it purchased, commandeered, and chartered many vessels from foreign and domestic sources; was given custody of numerous ships seized from the enemy; and supervised the drawing of plans and awarding of contracts for still hundreds of others. Counting all contracts for new tonnage, and all vessels actually built, purchased, commandeered, seized, and requisitioned, the Board became involved to the extent of 4,500 ships, totaling 24,500,000 deadweight tons. After the Armistice many of the contracts were canceled and some of the requisitioned ships were returned to their former owners, leaving approximately 3,400 vessels of all sorts as its legacy of the war. Sales up to and including June 30, 1929, reduced the Board's fleet to 552 ships, 233 in active operation and 319 in lay-up. During the fiscal year then ended, 266 vessels were sold for approximately $29,000,000. These included 11 passenger, 168 cargo, and 3 refrigerator ships, 9 tankers, and 75 miscellaneous vessels, including launches and lighters. Among the sales made were three established cargo Lines. Eleven of the other cargo ships sold were acquired by Lines previously owned by the Board.

Construction Loans.—The Jones-White Act which became law May 22, 1928, increased the construction loan fund from $125,000,000 to $250,000,000; extended the loan period to 20 years; provided a lower interest rate for vessels operating in foreign trade; and authorized loans for sums equal to three-fourths of the cost of new construction, reconditioning or remodeling. During the fiscal year, favorable action was taken on applications for loans involving $14,524,540, while the amounts actually advanced on loans during the same period totaled $6,728,790. A total of $18,886,790 has been loaned on vessels which have been completed, representing 64 loans made to 9 different companies in aid of construction of 15 vessels and two conversion jobs. On 2 vessels not completed at the end of the fiscal year, there had been advanced $3,780,000.

Dieselization Program Completed.—With the trial trip of the motorship *Jeff Davis* in Chesapeake Bay Oct. 17, the $25,000,000 Dieselization program of the Shipping Board may be said to have reached its consummation. Twenty ships of four different designs, but closely related in size and deadweight capacity, have been Dieselized. All are now in service.

OCEAN MAIL CONTRACTS

An important factor in reëstablishing a privately-owned American merchant marine and placing it on a securely competitive basis relative to foreign ships is the mail subsidy provision in the Jones-White Act of 1928. It was found, however, that the related conditions were not as clear as they might or should be. The Shipping Board in its annual report held that purchasers of Government shipping services were entitled to mail contracts and that any other course would be a breach of faith on the part of the Government. On the other hand, the Act makes it mandatory for the Postmaster General to award contracts to the lowest bidder. President Hoover, referring to our merchant marine in his message to Congress stated, among other things, that a conflict as to the administration of the Act had arisen and that the situation should be clarified. An inter-departmental committee appointed by the President soon after his inauguration, consisting of the Secretary of Commerce as Chairman, the Secretary of the Navy, the Postmaster General, and the Chairman of the Shipping Board, made a comprehensive survey of the policies being pursued under the Jones-White Act, the outcome of which were the desirability and necessity of securing much larger undertakings as to service and new ship construction in future contracts than those in force. A program of ship construction, based upon ocean mail subsidies, has been drawn. It calls for the building within five years of twenty-nine new vessels of an aggregate of 330,000 gross tons, at an estimated cost of $160,000,000 to $175,000,000 for the fifteen new ocean mail routes. The program calls for two new superliners for the New York-Channel ports route, and two cabin liners for the New York-Bremen run at a total cost of $80,000,000. All four new vessels are to be placed in service within four years. Bids on the new mail routes are returnable Feb. 15, 1930. The Government's compensation to ship lines for carrying ocean mails will be increased by about $5,000,000 a year, bringing the total expenditure for mail transportation under the Jones-White Merchant Marine Act to $20,000,000. During the fiscal year ended June 30, 1929, bids were accepted by the Postmaster General on 25 mail routes, 24 of which became operative. These contracts provided for the substitution of new vessels faster and larger than those with which the services were started.

PRIVATE OWNERSHIP TONNAGE RISES

Documented private ownership tonnage of 500 gross tons and over on Nov. 1, 1929, consisted of 1925 steel and wood vessels of 7,722,563 gross tons. This compares with 1956 units of 7,348,404 gross tons on Jan. 1, 1929. Of the number and tonnage on November 1st, 1929, steel vessels numbered

1431 of 7,104,010 gross tons, and those of wood, 494 of 618,553 gross tons. This compares with 1402 steel vessels of 6,664,094 gross tons and 554 wood vessels of 684,310 gross tons on Jan. 1, 1929.

SERVICES AND TRADES

On Nov. 1, 1929, vessels of the American merchant marine of 1000 gross tons and over, steam and motor propelled, numbered 1034 of 5,096,617 gross tons in foreign trade, and 880 of 4,888,344 gross tons in coastal trade. Sailing vessels of 1000 gross tons and over numbered 44 of 83,046 gross tons in foreign trade and 219 of 388,278 gross tons in coastal trade. Vessels of 500 to 900 gross tons, steam and motor propelled, numbered 6 of 4,147 gross tons in foreign trade and 87 of 65,645 gross tons in coastal trade. Sailing vessels of the same range of tonnage numbered 30 of 22,047 gross tons in foreign trade and 181 of 147,175 gross tons in coastal trade. Foreign trade, therefore, was represented by 1,114 vessels of 5,205,857 gross tons and coastal trade by 1,367 vessels of 5,489,442 gross tons. Combined totals indicate 2,481 vessels of 10,695,299 gross tons.

NEW SHIPS PRIVATELY OWNED

Contract Expenditures.—From Nov. 1, 1928 to May 1, 1929, new contracts involved an expenditure of $25,300,000 of which $17,900,000 was for the construction of 9 sea-going merchant vessels, and $7,400,000 for the construction of 39 vessels of miscellaneous types, such as barges, trawlers, yachts, tugs and carfloats. From May 1, 1929 to Nov. 1, 1929, new contracts involved an expenditure of $76,300,000 of which $65,300,000 was for the construction of 25 sea-going merchant vessels, and $11,000,000 for the construction of 48 merchant vessels of miscellaneous types. During the year ended Nov. 1, 1929, the approximate total contract price for construction of merchant vessels was $101,600,000. Approximate value of contracts for merchant vessels completed during year ended Nov. 1, 1929, including those unfinished on Nov. 1, 1928, was $28,000,000. Approximate contract price of unfinished merchant vessels on Nov. 1, 1929 was $93,300,000. Approximate number of workmen employed on construction of merchant vessels on Nov. 1, 1929, was 10,300.

Replacement Problem. — Replacement of the existing fleet of cargo vessels is one of the problems confronting the shipowner and shipbuilder for solution in the near future. While it may be said that the Construction Loan Fund aids private owners of all classes of vessel, it should be pointed out that not all can participate in the compensation for the carriage of mails. Further Government aid, therefore, is necessary to encourage the building of such vessels for services that cannot benefit from mail contracts. Remedial suggestions have been made as follows: (1)—Loan of a larger percentage of first cost from Construction Loan Fund. (2)—Waiving of interest during the construction period. (3)—Deferring of payment of interest for a period after completion of a cargo vessel. (4)—By such other methods as experience may demonstrate to be necessary.

Ship Contracts. — Dec. 16, 1929, vessels contracted for and being constructed under the provisions of the Merchant Marine Act, 1928, numbered 18 of 204,157 total gross tonnage. They comprised 4 of 8500 gross tons each of 18 knots for the Export Steamship Corporation; 1 of 8500 gross tons and 14 knots for the American South African Line, Inc.; 1 of 8000 gross tons and 16 knots for the Grace Steamship Company; 2 of 11,300 gross tons each, and 18 knots for the Ward Line; 2 of 18,500 gross tons each, and 18 knots for the Oceanic Steamship Company, 2 of 21,000 gross tons each, and 20 knots for the Dollar Line; 5 of 9,000 gross tons each for the Motor Tankship Corporation, and 1 of 7,057 gross tons and 18 knots for the New York & Porto Rico Steamship Company.

New Liner Fleet.—The past year marked the completion and entry into service of the *Pennsylvania*, largest merchant ship yet built in the United States. This vessel was the third of a trio of passenger and freight liners built in conformity with a $21,000,000 program at Newport News, Va., for account of the Panama Pacific Line, subsidiary of the International Mercantile Marine Company. The *Pennsylvania* left New York for San Francisco, Oct. 19 on her maiden voyage. In addition to being the largest commercial vessel built in this country, the *Pennsylvania* has the distinction of being the world's largest merchantman equipped with steam turbines and electric generators from which power is transmitted to the propellors through the medium of electric motors. Three more ships of like size and type are being considered by the owners, the objective being the maintenance of a regular weekly service instead of the fortnightly service now operative.

FUTURE STATUS OF SHIPPING BOARD

Relegation of the Shipping Board to the position of a regulatory body without control over the operation or disposal of vessels of the Government's merchant fleet is believed to be the primary motive behind the report submitted to Congress by Comptroller General McCarl in regard to the financial affairs of the Board. During his term as Secretary of Commerce, President Hoover made no secret of his belief that the Shipping Board should be divorced from the operation of the Government fleet and that the latter should be vested in a bureau of the Department of Commerce. Differences of opinion among members of the Board in regard to the sale of the American Diamond and American France lines which resulted in reference of the problem to the Interdepartmental Committee, thereby depriving the Shipping Board of power to act on any other sales in the meantime, have created a situation which seems to demand drastic action. The root of the trouble appears to be the granting of the preference privilege to the operators.

THE AIRSHIP AND AIRPLANE TECHNIQUE

By Ernest Jones

Aeronautical Expert, New York

GENERAL PROGRESS

Public Investment in Aerial Industry.—On the twenty-sixth anniversary of the flights of the Wrights, Dec. 17, 1929, the state of progress in American aeronautics exceeds that made by our railroads in the same first quarter century. The past four years particularly have seen an expansion unforeseen by even the most optimistic of the pioneers. The public, now fully alive to the possibilities of air transportation and its needs, is readily investing in air transportation, manufacturing and allied enterprises. Aeronautic securities were offered the public during the year to the amount of $248,200,000 and still other funds were devoted to the aircraft industry in private financing.

Transportation Demand.—The Department of Commerce has made rapid progress in a tremendous program of lighted and radio-aided airways. Contract air mail, passenger and express lines are regularly operating in an ever-increasing number of sections; airplanes are being purchased by individuals and business firms for the purpose of conducting their own affairs, in addition to purchases for air taxi, touring, photography and other air services. Over three times around the world at the Equator are being flown daily by regular transport services over 36,000 miles of routes by forty companies.

Technical Development. — Government and civil agencies are coöperating in an extensive program of technical development of aircraft, accessories, and aids to air navigation, and rapid progress is being made in the reduction of risk and cost.

In aerostation, the lighter-than-air branch of aeronautics, there is still little commercial activity, though transcontinental and transoceanic airship lines have been promised for several years.

PILOT AND AIRCRAFT REGISTRATION

Licenses.—At the end of 1929 there were active 9,472 pilots of one grade or another, federally licensed, double the number of the year before; in addition to which 29,324 student permits had been issued. Aircraft to the number of 6,646 were licensed while 3,060 others were similarly situated in the matter of identification only for purely intrastate operations. Various models of modern airplanes to the number of 276 were approved by the government, while 34 engines were given similar certificates, more than double the number a year ago.

AIRPLANE TYPES

Service Standardization.—Airplane types trend toward standardization for particular services. The biplane continues the favored for military purposes and in the smaller commercial models. For passenger transport and touring, monoplanes are still preferred whether single or multi-engined, though two companies are producing large passenger biplanes. Enclosed bodies are being produced in increasing numbers. The re-discovery of our waterways has caused the return of the seaplane and encouraged the amphibian. Metal floats or hulls have eliminated water absorption.

The Biplane.—The great bulk of civil production is in the light three-seater 90/100 hp. biplane, sold to private persons, flight students, and air taxi, sight-seeing, photography, and general air service operators as apart from air transport.

The Monoplane.—For transport and more extensive sight-seeing or touring, the multi-engined monoplane holds the dominant position. For use of industrial executives, private persons and miscellaneous flying, the standard is a cabin monoplane of 200 or more horsepower, considerable attention being given to interior finish, comfort and elimination of noise. Muffled exhausts and variable pitch propellers are having a belated introduction. Automatic pilots have again been given attention and future large transport planes will undoubtedly be so equipped. In the multi-engine class the cabin has practically all the personal conveniences of rail or water transport, and attention is being given to sleeping accommodations for long-distance night service. Such models are ever increasing in size and carrying capacity. The trend in transport models is to planes of giant size, the largest flown being of 56-ton weight. Still larger are in course of design.

Speed.—Airplane speed has not yet reached its limit apparently, as the winner of the 1929 international seaplane race made 357 miles an hour. The average commercial speed, however, has settled between 90 and 120 miles, and the immediate commercial demands will probably not warrant sacrifices in other directions for the sake of additional time saving.

Carrying Capacity.—Constant improvement is being made in performance. From approximately 2.02 pounds per square foot of wing-loading on the early Wright, we now have planes carrying 23 pounds to the square foot. The useful load has advanced from 17.6 to 50 per cent, and the speed from 40 to 135 miles per hour, in commercial planes, maximum.

AERODYNAMICS

Improvements.—Research has continued in fundamental problems. Various devices have been successfully demonstrated or are in course of development to give controllability to a plane which has, for any reason, assumed an attitude of instability. Other investigations of aerodynamic and structural safety, aerodynamic efficiency, differential aileron control, balanced and floating ailerons, ice formation, take-off and landing runs, engine cooling, retractable and fixed landing gears, variable air screws, fog flying, instruments, adjustable stabilizers, airships and the like are noted.

MACHINE PROGRESS

Materials.—Practically all American planes are now built with metal bodies and at least six all-metal (duralumin) planes are on the market and in operation in the hands of owners. Welding has increased in use.

Accessories.—Hydraulic and mechanical brakes are generally being applied on both military and civil planes of all types save light planes, in combination with shock absorbers. Commercial radio telephone sets, for both transmission and reception, are being put into actual use with the government's radio beacons and radio telephone transmitting stations and with the private stations of airway operators.

Instrumental Research.—Research work continues on the further development of present and new airplane instruments. The earth inductor compass has proved its capabilities. Among other instruments are greatly improved types of inclinometers, air speed indicators, bank and turn indicators, drift indicators, flight indicators, altimeters, etc. The arrangement on instrument boards has been condensed, and new systems combine the readings of several instruments in a single vertical panel comprising a number of scales on one vertical dial. "Blind" flying by the use of instruments and radio was demonstrated at the close of the year. The pilot entirely enclosed and unable to see anything except his instruments, took off, flew about and landed within a confined area. The "automatic pilot," demonstrated in 1913-4, has been given renewed attention this year, particularly by the Army, and its use in great transport planes is freely prophesied.

ENGINE DEVELOPMENTS

Air-cooled Engines.—The air-cooled type of engine holds predominance though several new water-cooled engines are on the market. Two 525-horsepower air-cooled engines are being marketed for military and transport purposes but the development of passenger planes tends to demand still higher powers. The 200-225-horsepower air-cooled engine, however, still remains the standard for general operations. A number of both types of engines are used in a position inverted from normal. To replace the 90-100-horsepower war surplus engine which has made possible the low priced two- and three-place planes now in the majority, many new designs are on the market, at, of course, higher prices. In the main these engines are air-cooled. Low-powered air-cooled engines are also finding an increasing market. Chemical cooling for the other type has been demonstrated and many authorities claim a renewed and wider use of the water or chemical cooled power plant.

Oil Engines.—Progress is being made with oil fuel injection engines. This type has reached a weight ratio which permits its use in airplanes, and one commercial engine has been extensively flown during this last year.

Radiators and Propellers.—The proper placing of radiators for minimum head resistance and efficient cooling in the new models of planes using liquid cooling, continues to receive attention, but the cartridge type of radiator has become standard. The expense of the wing radiator does not permit its use in commercial craft. There is continual development of manufacturing technique in propellers. Those of metal predominate and there is a strong trend towards adjustable blades.

FLIGHT FACILITIES

Lighting.—Over 12,000 miles of airways were lighted at the close of 1929, with 302 lighted intermediate fields along these routes, out of a total airway mileage of 36,000.

Weather Service.—A chain of radioed weather service crosses the continent from Boston to San Francisco and along the Pacific Coast which broadcasts half-hourly by radiotelephone to pilots in flight local conditions and forecasts. Weather reports are received from over 200 first order Weather Bureau stations, from 36 upper air airway offices and from more than 170 auxiliary Weather Bureau and Department of Commerce airway stations and consolidated for broadcasting by radio telephone or sent by radiotelegraph or ground lines to other airways not yet served by the radiotelephone system. In addition, private stations have been installed by airway operators for two-way telephone communication between the earth and the plane.

Radiobeacons.—Radiobeacons, which tell the pilot whether he is on or off his course, are in service between Omaha and Boston. Others are being installed across the continent and along the two coasts and will ultimately cover all airways.

Air Routes.—At the end of the year 60 separate airways totaling 35,965 miles, were being flown in and out of the United States by 37 operators; of these, 20 operators were contractors carrying mails over 24 routes covering 26,597 miles, nearly twice the mail mileage of the year before.

Airports.—Over 905 municipalities or commercial concerns have established airports, of which a third have been established in the past year. In addition the Army and Navy and Department of Commerce have 364 and there were 1,278 more proposed or under inauguration at the close of the year.

Hazards.—The hazard of fire has been largely reduced in both military and civil flying through the use of gravity feed, improved exhaust manifolds, fire walls and improved construction. In all flying the crash percentage grows smaller, and safety in flying scheduled routes is recognized by the life insurance companies which have eliminated exception clauses in policies. All phases of insurance are now written to cover air risks.

Air Marking.—It is estimated that some 12,000 air markers have been erected in cities and towns throughout the United States. Many nationally known corporations have marked their holdings scattered in all parts of the country. In addition municipal governments, chambers of commerce, and other civil organizations, clubs individuals, local concerns and others have sponsored the air marking of one or more buildings in their respective communities.

GOVERNMENTAL AIR AGENCIES

U. S. Army Air Corps.—The Army Air Corps is a separate combatant branch of the army. The five-year program passed by the Sixty-ninth Congress authorized an Assistant Secretary of War for Aeronautics and a strength of 1518 officers and 16,000 enlisted men including 2,500 flying cadets. The program anticipates a permanent material strength of 1,800 useful airplanes and such airships and balloons as the Secretary of War may deem necessary, with an annual replacement not exceeding 400. The total increase in personnel and equipment is to be distributed over the period. The same bill authorized an Air Section in the General Staff. The Air Corps maintains technical, tactical, engineering and flying schools under the direct supervision of the Chief of Air Corps, while a number of fields located at other places throughout the United States occupied by tactical units are under the immediate command of Corps Area or Department Commanders of the Army. The engineering division, which operates an elaborate plant at Dayton, Ohio, has continued its development work. While other types of military planes have become standardized, new designs of attacking and bombing planes are being built. Other experimental work includes aircraft armament, radio beacon and other radio, skiis, brakes and disc wheels, shock absorbers and cameras.

U. S. Navy Aeronautics.—See NAVAL AERONAUTICS, page 288.

The Post Office Department inaugurated the first air mail service in the United States and, until September 1, 1927, operated the transcontinental air mail. Both sections of this route were turned over to private enterprise at the latter date and all air mail routes now in operation are conducted by private enterprise under contract with the Post Office Department. There are 33 such routes in operation within the United States or going to foreign countries, all of whose mileage totals 26,597.

Mapping.—Forty-one of its program of fifty-two airway maps have been completed and the balance is in progress. Future work of this character is being done by the Department of Commerce. During the year both the Army and Navy photographed thousands of square miles for other purposes.

The National Advisory Committee for Aeronautics, composed of fifteen members, appointed by the President from governmental departments and civil life, is charged with the duty of the supervision and direction of the scientific study of the problems of flight, with a view to their practical solution and the determination of problems worthy of experimental attention, and the presentation of the results of their experimental and scientific work for the advancement of and practical application to the development of aeronautics. For the accomplishment of these ends, the N. A. C. A. has a well-equipped research laboratory located at Langley Field, Hampton, Va. The N. A. C. A. functions through an executive committee and standing technical committees, which assure coördination with other government air agencies and the public.

While accomplishing work in its own laboratory on the more fundamental principles of aeronautics, the Committee also functions in the direction and allocation of work on particular problems by various other governmental and private institutions. It not only makes available the results of its own experimental and research work but collects and makes available aeronautical data and information secured from existing agencies throughout the world.

OTHER GOVERNMENT AERONAUTICS

The President.—From the inception of flight the Presidents have lent encouragement. President Lincoln, it will be remembered, established America's first air service (balloons). Under the Air Commerce Act of 1926 the President is empowered to "set apart and protect air space reservations for defense, public safety, or other governmental purposes."

Department of State.—Aeronautic reports of the Diplomatic and Consular Services are made available to the industry, and during 1929 arrangements were made for air touring in various countries.

The Bureau of Foreign and Domestic Commerce maintains commercial attachés and trade commissioners in all important countries. Their reports are made available to the public; opportunities for the sale of American aeronautical equipment abroad are brought to the attention of American firms.

The Bureau of Standards has, from the beginning of flying, been actively engaged in the development of the technical side of aeronautics from almost every angle and is in contact with flight through the verification of instruments used in nearly every new record established by aircraft in this country and in the researches conducted for the various Departments. It has been given added duties in the development of the radiobeacon and other radio, lighting and other aids to air navigation for the Department of Commerce.

The Patent Office obviously has to do with aeronautic patents and their number runs into the thousands.

The Bureau of Mines uses the airplane frequently to carry rescuers and machinery to the scene of mine disasters and for surveys and maps. To the aeronautical world it is best known for its work in helium research. Its plant at Fort Worth produces the helium required by the military air services.

The Bureau of the Census is concerned with various statistics. In its biennial census of manufactures it includes aircraft, engines and accessories.

The Bureau of Lighthouses is now, under the Air Commerce Act, directly engaged in the installation and maintenance of light beacons and intermediate fields and other aids to air navigation such as the radiobeacon, radiotelegraph and radiotelephone along the airways.

The Coast and Geodetic Survey is now also charged with air mapping. The Survey has used aerial photographs in its normal work ever since 1920.

Department of Labor.—The Secretary of Labor, under the Air Commerce Act, designates ports of entry for air immigrant aliens, details men and applies the general immigration laws to air travelers.

Department of Agriculture.—The airplane and the airship have already been employed by this Department to a greater extent than in any other purely civil branch of the government, except the Post Office, in crop dusting and estimating, forest fire patrol, seeding and other work.

The Weather Bureau is now specifically charged with furnishing weather information to civil airways. New upper air stations have been established at airports or in their vicinities and a system of distribution was put into effect on the airways in the latter part of 1926.

The Forest Service has used airplanes for forest fire patrol annually since 1919.

The Forest Products Laboratory.—In the development of aircraft structures the laboratory has been of inestimable value to the airplane industry.

The Bureau of Entomology has conducted extensive war by air against wheat rust, the boll weevil, locusts and other pests.

The Bureau of Agricultural Economics has done crop reporting by airplane observation and aerial photography in experiments which successfully demonstrated the airplane's efficacy.

The Bureau of Public Roads uses the airplane in the making of mosaics of highways and this application of the airplane will increase in volume.

The Department of the Interior is charged with the supervision of the General Land Office, Bureau of Reclamation, Geological Survey, Office of Indian Affairs, Pensions, Bureau of Education, the National Park Service and the Government Railroad in Alaska.

The Geological Survey has extensively used airplanes, in the production of new maps and the correction of old.

The Treasury Department, under the Air Commerce Act, designates ports of entry for aircraft, details customs men, and applies the laws relating to customs and public health. The Internal Revenue uses airplanes in the attempt to enforce prohibition.

The Public Health Service has to do with quarantine regulations, the water supply on aircraft and other common carriers. Air immigrants must undergo medical examination by this service.

The Coast Guard, which renders assistance to vessels or aircraft in distress and gives medical aid to deep sea fisheries, also protects custom revenues, enforces laws and regulations governing anchorage of vessels in navigable waters, and quarantines, protects game and other fisheries, etc. A Coast Guard air service has been in existence for the past five years.

War Department.—The General Staff prepares war plans and considers how, when and where the Air Corps of the army will be employed with the other services. From the first use of balloons in American warfare in 1861, balloons and airplanes have been used with the artillery for fire control. Infantry has been familiar with aircraft for the same period, and aircraft is used in connection with their operations.

Army Air Corps.—(SEE FOREGOING.)

The Chemical Warfare Service, a comparatively new arm, is concerned with the development of toxic and other gases, smokes and incendiary material used by aircraft as well as otherwise.

Army Engineers have employed aircraft to a greater extent for their work on rivers and harbors, establishment of harbor lines, anchorage gounds, power projects, in surveying and mapping.

The Ordnance Bureau is concerned with the armament of aircraft but does not operate aircraft for its own purposes.

The Chief of the Signal Corps has charge of the development of all signal equipment, meteorological and other instruments used in connection with military aircraft in peace and war but this service no longer operates aircraft.

Navy Department. — (See NAVAL AERONAUTICS.)

Smithsonian Institution, among other things, has the custody of aeronautic material representing the proggess of the art. For more than threescore years it has been active in aeronautics. It encouraged three early attempts to cross the Atlantic by air and its officers were largely responsible for the use of the balloons in the Civil War and for the experiments of Langley.

The Board of Surveys and Maps correlates and coördinates the map and chart-making and using agencies of the government and provides contact with states, counties, cities and the public. The Board is composed of representatives from all governmental agencies interested in maps.

The Federal Power Commission is interested in all matters pertaining to the utilization of natural resources for the making and transmitting of power. The airplane is used in many of its surveys.

The Aeronautical Board appointed by the Secretary of War and the Secretary of the Navy, is concerned solely with aeronautics and is designed to prevent duplication and to secure coordination between the army and navy air services.

Advisory Air Coördination Committee, comprising the three Assistant Secretaries for Air of Commerce, Navy and War, recommends to the Secretaries of War, Navy, and Commerce general policies relating to the coördination of the air activities of the government.

Patents and Design Board.—The Army Air Corps Bill of 1926 created this Board consisting of the three Assistant Secretaries for Air. Any individual, firm or corporation may submit a design for aircraft, aircraft parts or aeronautical accessories, whether patented or unpatentable, to the Board. After favorable recommendation from the National Advisory Committee for Aeronautics, it can determine whether the use of such designs by the government is desirable or necessary, and fix worth to be offered the owner for rights.

Committee on Aircraft and Fog Flying Research.—To further research, particularly in fog flying, an unofficial committee was organized by the Daniel Guggenheim Fund for the Promotion of Aeronautics, comprising also representatives of the Department of Commerce, Bureau of Standards, Bureau of Aeronautics of the Navy, the Post Office and the Army Air Corps. Other subjects are also considered, such as the radiobeacon, capacity altimeter, field localizer, acoustic altimeter, lighting and others.

RADIO

By J. H. Dellinger

Chief of Radio Section, Bureau of Standards, Department of Commerce

GENERAL

Radio Use in Byrd Expedition.—Radio continued to advance in 1929, in commercial importance, in extent of use, and in technical developments. A striking instance of its versatility was the rôle it played in the work of the Byrd Antarctic Expedition. The members of this expedition on the Antarctic Expedition listened every day to the United States broadcast programs, relayed by high frequencies. They communicated daily news bulletins to the United States newspapers, and exchanged messages with their families. Radio was used on the airplanes of the expedition, and the detailed story of the flight over the South Pole was printed in the newspapers before the airplane returned to its base.

Review of Radio Possibilities.—A comprehensive survey of the possibilities of radio business throughout the world was made by the U. S. Bureau of Foreign and Domestic Commerce. Its pamphlet, *Radio Markets of the World, 1928-1929,* gives full information on the situation in each country, including the number of receiving sets in use, the number of broadcasting stations, and conditions affecting the uses of radio.

Broadcasting.—There was no special development of television and visual broadcasting. In 1927 came the first practical work in this field. Then 1928 brought a beginning of furnishing of service to the public by broadcasting simple moving pictures. There was no corresponding further development in 1929.

THE RADIO INDUSTRY

Manufactures and Sales.—The year 1929 was exceedingly prosperous in radio manufacturing and sales. The 50% increase of business in 1928 over the preceding year was equaled in 1929. The detailed figures showing this are not available yet. The best available figures on the radio business in recent years are those published by *Radio Retailing*, reproduced page 461 by permission (with some revisions).

RADIO EXPORTS

Year	*Value*
1922	$ 2,800,000
1923	3,450,000
1924	6,000,000
1925	9,900,000
1926	9,500,000
1927	9,200,000
1928	10,907,000

COMPARATIVE HOUSEHOLD STATISTICS (1928)

Number of homes in U. S.	28,061,000
Number of homes wired for electricity	19,012,664
Number of homes with automobiles	17,000,000
Number of homes with telephones	13,000,000
Number of homes with phonographs	13,000,000
Number of homes with radio sets	9,000,000
Number of farms	6,500,000

Receiving Sets Sold.—The same magazine revised its earlier estimates of the total number of receiving sets in use in the United States. It placed the number at 9,000,000 at the end of 1928, and this is believed to be the best estimate available of the number actually in service. This is, of course, much less than the total number produced or sold since popular interest in radio began, since many of the earlier sets have been scrapped. About 3,500,000 sets were sold in 1929, and the total number in use at the end of 1929 was probably 11,000,000. The total radio sales in 1929 were close to a billion dollars.

GOVERNMENT REGULATIONS

Broadcasting.—There were no marked changes in Governmental policies respecting radio during 1929. The 1928 allocation of broadcasting stations by the Federal Radio Commission stood the test of practical use, and no extensive changes in it were found necessary. Large numbers of licenses were granted to use the high frequencies, above 1500 kilocycles, for a great variety of services, including airplane-ground communication, ship telephony, and point-to-point telegraphy.

Proposed Communications Commission.—A bill was introduced into Congress to place telephony and telegraphy as well as radio under the jurisdiction of a Communications Commission. A subsequent amendment added interstate electric power transmission to the duties of this projected body. Extensive hearings were held in the Senate on this bill. The proposal is so far-reaching, and the interests involved so tremendous, that it would represent a major change in the Government. The hearings and debate on the proposal are expected to last several years. It had the effect of determining Congress to extend the administrative life of the Federal Radio Commission for an indefinite period, pending decision regarding the Communications Commission.

International Questions.—There was one development in international radio regulation affecting the development of radio in the United States. This was the meeting of the International Technical Consulting Committee on Radio Communication at The Hague, Holland, Sept. 18 to Oct. 2. This body was created by the International Radio Conference at Washington in 1927. It is to meet every two years, and advise the nations on technical radio problems. At this meeting it considered questions centering about the width of the frequency channels required for simultaneous radio communications, which determines in turn how many transmitting stations can be operated without undue interference. This problem was most acute at the high frequencies, above 6,000 kilocycles, as it is there that there is the greatest demand for channels and also where the value of channels is greatest because

TOTAL RADIO SALES (1922-1928)

		1922	1923	1924	1925	1926	1927	1928
Radio Sets, factory-built	No.	100,000	250,000	1,500,000	2,000,000	1,750,000	1,350,000	3,100,000
	$	$5,000,000	$15,000,000	$100,000,000	$165,000,000	$200,000,000	$168,750,000	$372,000,000
Radio-Phonograph Combinations.	No.	....	....	....	....	....	....	81,000
	$	....	....	....	....	....	....	$38,000,000
*Reproducers (excluding 841,000 in consoles and combinations)	No.	25,000	500,000	1,500,000	2,000,000	2,000,000	1,400,000	2,460,000
	$	$750,000	$12,000,000	$30,000,000	$32,000,000	$30,000,000	$28,000,000	$66,400,000
Tubes	No.	1,000,000	4,500,000	12,000,000	20,000,000	30,000,000	41,200,000	50,200,000
	$	$6,000,000	$17,000,000	$36,000,000	$48,000,000	$58,000,000	$67,300,000	$110,250,000
Furniture (separate)	No.	....	....	....	....	....	....	800,000
	$	....	....	....	....	....	....	$42,000,000
A-B-C (Dry) Batteries	$	$4,500,000	$6,000,000	$55,000,000	$66,000,000	$80,000,000	$68,000,000	$50,400,000
A-B Power Units, Storage Batteries and Chargers	$	....	$7,000,000	$25,400,000	$30,000,000	$55,000,000	$34,000,000	$17,500,000
Other accessories (1928 does not include furniture)	$	$3,750,000	$4,000,000	$11,600,000	$24,000,000	$33,000,000	$38,550,000	$8,000,000
Parts (does not include sales to manufacturers)	$	$40,000,000	$75,000,000	$100,000,000	$65,000,000	$50,000,000	$21,000,000	$12,000,000
Totals								
Sets	$	$5,000,000	$15,000,000	$100,000,000	$165,000,000	$200,000,000	$168,750,000	$306,000,000
Parts	$	$40,000,000	$75,000,000	$100,000,000	$65,000,000	$50,000,000	$21,000,000	$12,000,000
Accessories	$	$15,000,000	$46,000,000	$158,000,000	$200,000,000	$256,000,000	$235,850,000	$332,550,000
Total Sales for Year	$	$60,000,000	$136,000,000	$358,000,000	$430,000,000	$506,000,000	$425,600,000	$716,550,000

* Loud-speakers.

they are used for long-distance transoceanic communication. It was concluded that it is now practicable to operate channels one-tenth per cent wide. This meeting also established tolerances on the frequency of transmitting stations, i.e., limits beyond which the frequency may not vary during transmission. Such tolerances are a necessary prerequisite to further progress in radio, since departures from the assigned frequency cause a station to operate on or close to the frequencies of other stations, with interference as the result.

BROADCASTING

Receiving Sets.—There was a general improvement in receiving sets, largely through the adoption by most manufacturers of a four-element tube called the screen-grid tube. In this type of tube, feed-back due to tube capacity is virtually eliminated. Much greater amplification can be provided in a single tube. Consequently receiving sets were simplified by using fewer tubes for the same output.

Broadcasting stations were improved during the year by a general rise in the level of power used, thus giving the listener a proportionately greater chance to hear the station through the electrical interference and noises in his receiving set. The power was raised from an average of approximately 1 to approximately 2 kilowatts. There were 606 broadcasting stations in operation.

Chain station programs, largely originating in New York, continued to increase in popularity. The chains of the National Broadcasting Company and the Columbia Company continued to grow. A total of 72 stations regularly used the National Broadcasting Company programs, and many more stations were added for particular events.

International Broadcasts. — Some notable international broadcasts took place. Nov. 5 the voice of Prof. Albert Einstein, speaking in Berlin, was broadcast to the American audience over a chain of stations, in connection with the Edison electric light celebration. The voice was transmitted from Europe to America over the regular (low-frequency) commercial radio telephone. Dec. 12 Marconi spoke in London, and his voice was relayed by high-frequency radio to America and broadcast over a chain of stations.

Advertising Practices.—The abuse of radio broadcasting as an advertising medium became pronounced in 1929. It became common, even in connection with the best programs by leading artists, to introduce direct appeals to purchasers of the products sold by the sponsors of the programs. This was carried beyond the limit of commercial efficiency, and led to serious effort in the radio industry for an improvement in these practices.

TRANSOCEANIC COMMUNICATIONS

Telegraphy. — The high-frequency beam stations became so effective in most stations, the older and higher power low-frequency stations were relegated to the status of stand-by transmitters. In general, a high-frequency stations uses one frequency at night and a higher frequency in the day. These developments have been world-wide. The radio telegraph services of the United States, linking it to other nations, are now the most extensive in the world.

Telephony.—This service was greatly extended in 1929. There are now four independent circuits between the United States and Europe, all *via* New York and London, three of them on high frequencies and one on low. The construction of the equipment was completed for service between the United States and South America.

Foreign Developments. — Similar developments took place in other parts of the world. Service was opened between London and Australia, Berlin and Buenos Aires, Holland and the Dutch East Indies (Java and Borneo). Construction was begun in South Africa for service between there and London, to include multiplexing of telegraphy, facsimile, and telephony.

MARINE RADIO

Telephony.—In the marine field, also, telephony made progress. Dec. 8

commercial radio telephony was inaugurated. Ship-to-shore telephone conversation is now available, at $7 per minute, between any United States telephone and the Leviathan at sea. Other ships will be added from time to time.

Lighthouse Radio Beacons.—The number of radio beacon stations operated by the Lighthouse Service was increased to 65. These are located at lighthouses and on light vessels. They send out identifying dot-and-dash signals during fog. Direction and position are determined from these signals by ships equipped with radio direction finders. The Safety of Life at Sea Conference, held at London in May, adopted a requirement that all passenger ships over 5,000 tons gross shall be provided with an approved direction finder within two years after the Convention comes in force.

Auto-alarms.—The same Conference decided that auto-alarm apparatus may be used as a substitute for an operator or a watcher on vessels where more than one operator is required. To date, only British ships use this device. There are 2,213 American vessels equipped with radio transmitters.

AERONAUTIC RADIO

General Policy.—Over 100 airplanes were equipped with radio apparatus. Transmitting stations were erected at 78 airports. The air transport companies began to take great interest in radio, as a means of increasing reliability and safety, and hence efficiency and profits. Government and private authorities agreed on a general policy for aeronautical radio development. This includes the furnishing of radio beacon service and broadcast telephonic weather information to pilots in flight from Government stations, on 285 to 350 kilocycles. This will be supplemented by two-way telephone communication between airplanes and airport stations, this service to be maintained by the air transport companies, on frequencies from 1,500 to 6,000 kilocycles. This will be supplemented further by low-power Government-maintained two-way telephone service for the itinerant flyer when close to an airport.

Research work brought nearer the day when pilots can land with confidence in dense fog. Government and other agencies carried on intensive work, using radio and other methods, on this problem. Some blind landings under experimental conditions indicate that the radio beacons, beams, and other devices will be developed into practical fog landing facilities.

AMATEURS

There are 16,829 amateur transmitting stations in the United States. They operate exclusively in certain narrow bands of high frequencies. They have developed measurement methods which are working well in practice, to assure that their frequencies remain within the assigned bands. Their activities in radio telephony increased, particularly, telephone conversations with foreign countries.

STATISTICS OF MANUFACTURES

By LeVerne Beales

Chief Statistician for Manufactures, Bureau of the Census

BIENNIAL CENSUS

The Biennial Census of Manufactures covering production in 1927 was taken in 1928. The preliminary figures for certain important industries were presented and discussed briefly in the 1928 issue of The American Year Book, but the complete and final statistics were not available until 1929.

Outstanding features of a general character which were disclosed by the census are: (1) a marked increase in production as compared with 1925, although, because of reductions in prices, the gross value of products remained practically stationary; (2) a reduction in the number of employees, indicating an increase in output per

SUMMARY FOR ALL MANUFACTURING INDUSTRIES, 1919 TO 1927 AND FOR MAJOR GROUPS, 1925 AND 1927.

Group	Census year	Number of establishments	Wage earners (average for the year)	Wages	Cost of materials, containers for sale with products, fuel, and purchased electric current	Value of products	Value added by manufacture [1]	Horsepower [2]
				Expressed in thousands of dollars [3]				
All industries	1919	274,402	9,039,171	10,459,743	37,252,715	62,151,721	24,899,005	29,323,653
	1921	196,098	6,944,315	8,200,360	25,291,734	43,618,566	18,326,832	[4]
	1923	196,182	8,776,646	11,007,851	34,683,915	60,529,574	25,845,659	33,092,222
	1925	187,224	8,381,511	10,727,338	35,896,886	62,668,260	26,771,373	35,766,944
	1927	191,866	8,349,755	10,848,803	35,133,137	62,718,347	27,585,210	38,825,681
1. Food and kindred products	1925	47,947	662,010	791,049	7,709,917	10,373,082	2,663,166	3,876,268
	1927	49,787	679,520	823,388	8,113,433	11,015,860	2,902,427	4,134,973
2. Textiles and their products	1925	24,450	1,628,283	1,654,814	5,349,925	9,126,155	3,776,230	3,986,522
	1927	26,843	1,694,416	1,759,958	4,922,716	8,950,473	4,027,757	4,173,438
3. Lumber and allied products	1925	21,926	921,266	978,472	1,725,351	3,689,127	1,963,776	3,472,970
	1927	20,163	862,667	929,790	1,633,938	3,457,427	1,823,489	3,321,755
4. Paper and paper products	1925	2,743	222,745	264,692	921,659	1,560,480	638,821	2,575,520
	1927	2,989	225,506	273,571	1,084,932	1,799,780	714,848	2,814,795
5. Printing, publishing, and allied products	1925	23,810	314,021	540,824	692,576	2,583,205	1,890,629	485,274
	1927	25,416	327,534	584,766	752,469	2,846,078	2,093,609	568,427
6. Chemicals and allied products	1925	7,282	244,812	296,526	1,830,592	3,211,230	1,380,639	1,748,481
	1927	7,541	253,436	317,908	1,803,085	3,351,892	1,548,808	1,848,309
7. Products of petroleum and coal	1925	1,582	136,366	210,034	2,356,583	3,230,009	873,425	1,241,877
	1927	1,418	141,655	217,485	2,262,699	3,060,226	797,527	1,513,314
8. Rubber products	1925	530	141,869	191,286	721,730	1,260,805	539,075	659,691
	1927	516	141,997	198,074	660,370	1,225,077	564,707	790,622
9. Leather and its manufactures	1925	4,243	314,025	355,346	1,012,881	1,763,709	750,829	413,173
	1927	4,265	315,991	364,447	1,088,641	1,869,305	780,664	419,591
10. Stone, clay, and glass products	1925	8,478	353,036	467,012	603,427	1,640,652	1,037,225	2,348,157
	1927	8,673	350,017	464,273	594,774	1,612,549	1,017,774	2,709,131
11. Iron and steel and their products, not including machinery	1925	6,068	851,270	1,284,339	3,734,350	6,461,668	2,727,318	7,518,999
	1927	6,346	835,501	1,264,406	3,544,908	6,199,252	2,654,345	8,323,037

SUMMARY FOR ALL MANUFACTURING INDUSTRIES, 1919 TO 1927 AND FOR MAJOR GROUPS, 1925 AND 1927 (Cont.)

12. Nonferrous metals and their products	1925	6,924	275,292	380,781	1,946,777	2,833,770	886,993	1,158,486
	1927	6,658	270,545	380,365	1,780,358	2,668,697	888,339	1,219,598
13. Machinery, not including transportation equipment	1925	11,807	858,843	1,225,359	1,985,367	5,020,281	3,034,914	2,714,377
	1927	12,037	886,427	1,287,778	2,062,671	5,368,015	3,305,344	3,009,265
14. Transportation equipment, air, land, and water	1925	2,778	559,578	908,488	3,389,101	5,451,753	2,062,652	1,888,961
	1927	2,537	494,905	803,298	2,907,949	4,693,972	1,786,022	2,027,686
15. Railroad repair shops	1925	2,363	457,755	668,192	563,646	1,332,679	769,033	942,248
	1927	2,309	428,672	648,908	545,492	1,289,695	744,203	1,110,821
16. Miscellaneous	1925	14,293	440,340	510,122	1,353,006	3,129,654	1,776,648	735,940
	1927	14,368	440,966	530,387	1,374,703	3,310,050	1,935,346	840,919

---

[1] Value of products less cost of materials, containers for sale with products, fuel, and purchased electric current.

[2] Rated horsepower of prime movers (steam engines and turbines, internal-combustion engines, and water wheels and turbines) plus rated horsepower of electric motors driven by purchased current.

[3] Each total is the sum, expressed to the nearest thousand, of the individual items expressed in units. For this reason the totals in some cases may differ slightly from the sums of the items as here given.

[4] Not called for on schedule.

wage earner, and (3) a marked increase in the use of electric power in factories, with only a slight increase in the use of primary horsepower (steam, internal-combustion, and water) generated in factories.

MANUFACTURING PRODUCTION

References.—These facts merely show a continuation of trends which have been obvious for a number of years past, especially since 1921. The increase in production during the first quarter of the present century is discussed in detail in a monograph entitled *The Growth of Manufactures*, prepared by Professor Edmund E. Day of the University of Michigan, and Dr. Woodlief Thomas of the Federal Reserve Board, and published sometime ago by The Bureau of the Census.

Value and Prices.—Although the gross value of products showed practically no change between 1925 and 1927 (1925, $62,668,259,591; 1927, $62,718,347,289), an increase of about 7 per cent is indicated when the decline in wholesale prices of manufactured and semimanufactured products is taken into account; an average of the wholesale price indexes for manufactured products and semi-manufactured products, compiled by the Bureau of Labor Statistics, Department of Labor, shows a decline from 101.7 for 1925 (based on 100 for 1926) to 94.8 for 1927. Since the number of wage earners showed only a very slight change—a decrease of about three-tenths of 1 per cent, from 8,381,511 in 1925 to 8,353,977 in 1927—approximately the same rate of increase is indicated for the average output per wage earner.

Power Statistics.—The rapidity of the change from the factory power plant to the use of electric motors driven by current from central electric stations is brought out by the power statistics. The rated horsepower of steam engines and turbines, internal-combustion engines, and water wheels and turbines in use in manufacturing industries decreased slightly, at the rate of about 1 per cent, from 19,902,306 in 1925 to 19,693,371 in 1927, and the power of electric motors driven by current generated in factory power plants increased slightly more than 9 per cent, from 10,254,658 to 11,206,979; whereas the power of electric motors driven by purchased current increased more than 20 per cent, from 15,864,638 to 19,132,310.

Comparing 1927 with 1919, we have a decrease of a little less than 2 per cent, from 20,041,112 to 19,693,371, in the power of prime movers in factory power plants; an increase of 61 per cent, from 6,968,950 to 11,206,979, in the power of electric motors driven by current generated in factory power plants; and an increase of 106 per cent, from 9,282,541, to 19,132,310, in the power of motors driven by purchased current.

MANUFACTURING CLASSIFICATION

For census purposes manufacturing is classified into 340 separate industries. These include a few "borderline" industries not ordinarily considered as manufacturing, the most important of which is printing and publishing. The leading ten of these industries, arranged according to value of products, are according to the following table.

Industry	*Value of Products*	*Rank*	
		1927	1925
Slaughtering and meat packing, wholesale	$3,057,215,718	1	2
Motor vehicles, not including motorcycles	2,848,442,843	2	1
Steel works and rolling mills	2,779,840,238	3	3
Printing and publishing	2,507,425,913	4	5
Foundry and machine-shop products, not elsewhere classified	2,259,794,443	5	6
Petroleum refining	2,142,648,503	6	4
Electrical machinery, apparatus, and supplies	1,637,307,035	7	8
Cotton goods	1,567,400,612	8	7
Women's clothing, not elsewhere classified	1,494,401,044	9	12
Bread and other bakery products	1,394,700,224	10	13

The leading ten, arranged according to number of wage earners employed, are listed in the table on the following page.

Industry	*Wage Earners* (average for the year)	*Rank* 1927	1925
Cotton goods	467,596	1	2
Lumber and timber products, not elsewhere classified	413,496	2	1
Foundry and machine-shop products, not elsewhere classified	397,814	3	4
Steam-railroad repair shops	397,088	4	3
Steel works and rolling mills	361,312	5	5
Printing and publishing	261,671	6	6
Electrical machinery, apparatus, and supplies	241,566	7	7
Boots and shoes, other than rubber	203,110	8	9
Knit goods	190,283	9	11
Motor vehicles, not including motorcycles	187,910	10	10

Process Values.—The best method of comparing industries for the purpose of bringing out their relative importance is that based on "value added by manufacture." This term is used by the Census Bureau to denote the value created by the manufacturing processes, and is calculated by subtracting the cost of materials (including containers for sale with products), fuel, and purchased electric current from value of products. Arranged on this basis, the leading ten industries are:

Industry	*Value Added by Manufacture*	*Rank* 1927	1925
Printing and publishing	$1,845,466,517	1	1
Foundry and machine-shop products, not elsewhere classified	1,387,004,097	2	2
Steel works and rolling mills	1,090,184,943	3	3
Electrical machinery, apparatus, and supplies	991,545,336	4	5
Motor vehicles, not including motorcycles	959,016,594	5	4
Lumber and timber products, not elsewhere classified	720,686,563	6	6
Bread and other bakery products	701,464,061	7	10
Cotton goods	695,808,711	8	9
Steam-railroad repair shops	690,120,435	9	7
Women's clothing, not elsewhere classified	684,880,919	10	11

It will be noted that the rank of the first three of the industries listed in the table immediately above remained unchanged in 1927 as compared with 1925. The motor-vehicle and electrical-apparatus industries, however, changed places, the former dropping from fourth to fifth place and the latter rising from fifth to fourth. This is explained by the fact that Ford's production in 1927 was below normal. The most pronounced change is the rise of the bakery industry from tenth to seventh place, with a gain of more than a hundred million dollars in value added by manufacture. A summary of industries will be found on pages 464-465.

COGNATE SOCIETIES

MANUFACTURERS

AMERICAN ASSN. OF CREAMERY BUTTER MFRS., 208 S. LaSalle St., Chicago, Ill.

AMERICAN ASSN. OF OIL BURNER MFRS., 350 Madison Ave., New York City.

AMERICAN ASSN. OF WOOLEN AND WORSTED MFRS., 45 East 17th St., N. Y. C.

AMERICAN AUTOMOBILE ASSN., Penn. Ave. at 17th St., Washington, D. C.

AMERICAN BOTTLERS OF CARBONATED BEVERAGES, 726 Bond Bldg., Washington, D. C.

AMERICAN BRUSH MFRS. ASSN., 505 Arch Street, Philadelphia, Pa.

AMERICAN HARDWARE MFRS. ASSN., 342 Madison Ave., New York City, New York.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, 350 Madison Ave., New York City.

AMERICAN IRON AND STEEL INSTITUTE, 75 West Street, New York City.

AMERICAN IRON, STEEL AND HEAVY HDWE. ASSN., 47 West 34th St., New York City.

AMERICAN PAPER AND PULP ASSN., 18 E. 41st Street, New York City.

AMERICAN PETROLEUM INSTITUTE, 250 Park Ave., New York City.

AMERICAN ZINC INSTITUTE, INC., 27 Cedar Street, New York City.

Electrical Mfrs. Council, 30 East 42nd St., New York City.

National American Wholesale Lumber Assn., 41 East 42nd St., New York City.

National Assn. of Cotton Mfrs., 80 Federal St., Boston, Mass.

National Assn. of Electrical Contractors and Dealers, 15 West 37th St., N. Y. City.

National Assn. of Ice Industries, 163 W. Washington St., Chicago, Ill.

National Assn. of Mfrs. of the U. S. of America, 11 West 42nd St., N. Y. City.

National Assn. of Wool Mfrs., 80 Federal Street, Boston, Mass.

National Automobile Chamber of Commerce, 366 Madison Ave., N. Y. C.

National Electric Light Assn., 420 Lexington Ave., New York City.

National Electrical Mfrs. Assn., 420 Lexington Ave., New York City.

National Lumber Mfrs. Assn., Transportation Building, Washington, D. C.

National Machine Tool Builders Assn., 630 Vine St., Cincinnati, Ohio.

National Metal Trades Assn., 50 Broadway, New York City.

National Paint, Oil and Varnish Assn., Inc., 18 E. 41st Street, N. Y. City.

New York Lumber Trade Assn., 5624 Grand Central Terminal, New York City.

Rubber Assn. of America, Inc., 250 West 57th Street, New York City.

Silk Association of America, 468 Fourth Ave., New York City.

United States Brewers Assn., 55 West 42nd Street, New York City.

United Typothetae of America, Tower Bldg., 14 & K Sts., N.W., Washington, D. C.

TRANSPORTATION AND COMMUNICATION

Aerial League of America, 280 Madison Ave., New York City.

American Association of Railroad Supts., 111 Union Station, St. Louis, Mo.

American Electric Railway Assn., 292 Madison Ave., New York City.

American Marine Assn., 414 Washington Street, New York City.

American Railway Assn., 30 Vesey St., New York City.

American Road Builders Assn., 914 National Press Bldg., Washington, D. C.

American Steamship Owners Assn., 11 Broadway, New York City.

Associated Traffic Clubs of America, 418 S. Market St., Chicago, Ill.

Committee on Public Relations of the Eastern Railway Presidents' Conference, 143 Liberty St., New York City.

Council of American Shipbuilders, Inc., 50 Broadway, New York City.

International Amateur Radio Union, 1711 Park St., Hartford, Conn.

Maritime Assn. of the Port of New York, 78 Broad St., New York City.

National Aeronautic Association, 910 17th St., Washington, D. C.

National Assn. of Broadcasters, 1265 Broadway, New York City.

National Association of Owners of Railroad Securities, 11 E. 36th St., N. Y. C.

National Council of American Importers and Traders, Inc., 45 E. 17th St., N. Y. C.

National Highway Traffic Assn., 12 E. 53rd St., New York City.

National Industrial Traffic League, 58 E. Washington St., Chicago, Ill.

New York State Waterways Assn., 1012 Prudential Bldg., Buffalo, New York.

North American Export Grain Assn., Inc., 2 Broadway, New York City.

Rail Road Security Owners Assn., 501 Chandler Bldg., Washington, D. C.

Railway Business Assn., 1406 Packard Bldg., Philadelphia, Pa.

Traffic Assn. of America, 27 William Street, New York City.

Traffic Vigilance League, Inc., 186 Fifth Ave., New York City.

United States Ship Operators' Assn., Inc., 149 Broadway, New York City.

Western Railway's Committee on Public Relations, 105 West Adams St., Chicago, Ill.

PART FIVE
SOCIAL CONDITIONS AND AIMS

DIVISION XIV
IMMIGRATION, RACES AND POPULATION

RACE CONDITIONS IN THE UNITED STATES

By Harry H. Laughlin
Carnegie Institution of Washington

RACIAL ASPECTS OF IMMIGRATION

The nation's immigration policy continues to constitute the greatest single factor in controlling change in racial conditions in the United States. The quota system has distributed the racial sources of immigrants among countries roughly in proportion to their present representation in the blood of the American population. This policy, where applicable, has resulted in a material slowing down in the increase of the less assimilable alien population of the country. The result has been an increased opportunity for the Americanization of alien stocks which, before the passage of the Johnson Immigration Act of 1924, had tended to segregate, and to form alien blocs within the American population, which delayed if they could not resist ultimate assimilation.

THE AMERICAN INDIAN

All Indians of the United States were made citizens by Act of Congress in 1924. There are now "no Indians not taxed." It is estimated that the Indian population of the United States at the present time comprises about 340,000 persons distributed among 193 tribes. Thus, in the population of the whole country, one person in about 360 is an Indian. Dr. J. H. Spinden of the Peabody Museum of Harvard University estimates that among the Indians of the United States about 200,000 are of pure blood. For the most part the remainder are mixed with varying portions of white blood, while a relatively small portion are mixed with negro blood. The policy of the American people toward the Indian in the United States seems to look toward the termination of wardship and placing the Indian on his own economic and social responsibility, just as the negro after emancipation was made to carry his own responsibilities. In the whole of the New World it is estimated that there are now approximately 25,000,000 Indians, but the only proportion of them outside of the United States, who at present constitute a racial problem in the United States, are those who live in Northern Mexico, and who, both legally and illegally, along with white Mexicans, continue to cross the Rio Grande in great numbers.

INTRA-NATIONAL MIGRATION

The Southern negro continues to migrate to the northern industrial centers but apparently not to northern farms. This movement toward industrial centers has affected not only the southern negro, but all rural population of the country. Future studies in vital statistics will be of great value when they are able to give more extensively and accurately the relative reproductive rates of negroes, native-whites and alien-whites in the industrial centers of the country, compared with rates for the same groups in rural communities.

The Filipino is a citizen of the Philippine Islands, but not of the United States. He continues to come to Hawaii and to the continental United States in increasing numbers in response to labor demands. In Hawaii the Filipino has become the most numerous of currently arriving aliens, and on the Pacific Coast of the United States large numbers are establishing themselves. There is nothing in the Immigration Act of 1924 to prohibit or limit Filipino immigration to the States, although such is within the power of Congress. The general immigration legislation of the United States covers the several states, the District of Columbia, Alaska, Hawaii, Porto Rico and the Virgin Islands, as a receiving unit and with absolutely free intra-migration rights.

Unless the legislature of the Philippine Islands, with the approval of the President of the United States, enacts an immigration law applicable to the Philippine Islands only, immigration into the Philippine Islands is governed by the United States Immigration Act of 1917. The Philippine legislature has not enacted an independent immigration statute. The Filipinos are free to come to the United States and its territories, and by the same statutes the Philippine Islands are protected against the free immigration of the Chinese (Sec. 38, Laws of 1917), who, due to population pressure in China and inviting opportunities for livelihood in the Philippine Islands, would, if unrestricted, probably constitute a considerable migration.

PAN-AMERICAN IMMIGRATION POLICY

Relation to Racial Conditions.—The present immigration laws of the United States do not limit by quota the number of immigrants admissible from countries and colonies of the Western Hemisphere. However, the immigration laws establish a racial standard applicable to the whole world, based upon the Naturalization Law of 1875, which limits naturalization, and consequently immigration, to "free white persons; and aliens of African nativity and persons of African descent." Thus, so long as the would-be immigrants from any part of the Western Hemisphere are white persons, or persons of negro descent (their personal qualifications being requisite in health, literacy and the like) they may enter the United States as immigrants without numerical limitation.

Mexico.—These same laws exclude the Hindus, the Chinese and Japanese, and apparently, by their wording, the American Indian, he being neither white nor black. A test case is said to be pending which will determine whether this rule applies to the restriction of Mexican immigrants with patent portions of Indian blood. If thus applied these existing laws would limit immigration from Mexico to "white persons" and to persons of "African descent."

Canada.—The working out of quota-free privileges for immigrants from other countries of the Western Hemisphere has resulted in the continued reciprocity in population movement between the United States and Canada. These two populations in the main being quite identical in race-descent, no striking racial phenomena have resulted, the one exception being the immigration of large numbers of French Canadians into New England.

West Indian Negroes.—From other countries of the Western Hemisphere immigration has been negligible, except from the British West Indian colonies, which have contributed large numbers of black immigrants to the United States. The racial limitations of our naturalization laws, and through them, of our immigration rules, admit West Indian blacks, their personal qualifications being requisite, without numerical limitation. There seems to be a growing tendency of American-born negroes to resist the immigration of West Indian negroes, who have come to the United States speaking the English language and who compete almost immediately in the labor market with the American negro.

THE CENSUS OF 1930

Data on Race Distribution.—The Census of 1930 is being anxiously looked forward to, to give data on primary racial conditions of the United States. This census will cover particularly the northern trend of the negro, the distribution of the American Indian, the number of Filipinos, Chinese, Japanese and Mexicans in the United States, as well as number and distribution of native-born whites of native parents; of native-born whites one or both of whose parents are of foreign birth, and of persons of foreign birth. It is understood that for the first time the census will record Mexicans as such.

Race Classification.—However, the plans for the Census of 1930 still lack provisions for analysis of the particular European racial descent of the whole white population of the country. The census will give classification by primary races only,—White, Black, Yellow and the American Indian. The white race will be broken up in classes as above listed, but it will not be possible from the census analysis to determine the racial make-up, by percentage of particular European racial descents, of the whole white population of the country.

Determination of National Origins.—When the Immigration Act of 1924 was being drafted, nobody could turn to the census and secure data on "national origins" of the American population. In place of census data giving this information, "national origins" as a quota-basis had to be determined as nearly as possible by historical and demographic research. In tracing the racial fortunes of the American people, the census will not give adequate service until it includes in its decennial provisions items calling for the particular European racial descent of each parent of each white person enumerated. Experimental field studies have demonstrated the feasibility of such a provision. Because national institutions depend primarily upon the racial and family-stock quality of the people, it is essential that each nation, from decade to decade, keep close account of the trend in the racial make-up of its inhabitants.

PRESIDENT HOOVER ON IMMIGRATION

Restriction and Fitness of Immigrants.—In his annual message to Congress, December, 1929, President Hoover said: "Restriction of immigration has from every aspect proved a sound national policy. Our pressing problem is to formulate a method by which the limited number of immigrants whom we do welcome shall be adapted to our national setting and our national needs. I have been opposed to the basis of the quotas now in force and I have hoped that we could find some practical method to secure what I believe should be our real national objective; that is, fitness of the immigrant as the physique, character, training, and our need of service."

Racial Selection.—The President does not directly mention the racial aspects of immigration. Experience has demonstrated that there are two major factors in profitable immigration selection. The first is racial selection, which the quota system, for the most part, is handling successfully, and the second is individual and family-stock selection within the several racial quotas. It is the individual fitness that President Hoover particularly stresses at this time. Though no less surely the family-stock and racial bases are covered by his declaration that immigrants "shall be adapted to our national setting and our national needs."

LEGISLATION

Racial Integrity Laws.—In current legislation and legislative efforts affecting American racial conditions two features stand out. The first is the gradual extension of the so-called "racial integrity laws" among the several States. This law defines a colored person as one "any of whose ancestors is a colored person" and prohibits the intermarriage of colored persons, thus defined and ranging from "all black" to "pass-for-white," with white persons. Dr. W. A. Plecker, Registrar of Vital Statistics of the Commonwealth of Virginia, has compiled the so-called "Racial Integrity" laws of several states. In reference to the amount of negro blood which, in various states in 1929, makes marriage with whites illegal, the following situation is found:

None-Permissible: Alabama, Georgia, Virginia; Negro or Negro-Descent: Arizona, Louisiana, Montana, Nevada, Oklahoma, South Dakota, Utah, West Virginia; One Eighth Negro Blood: Florida, Indiana, Maryland, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, South Carolina, Tennessee, Texas; One Quarter Negro Blood: Kentucky, Oregon; One Half Negro Blood: Arkansas, California, Colorado, Delaware, Idaho, Wyoming; No Restriction: Connecticut, District of Columbia, Illinois, Iowa, Kansas, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New Mexico, New York, Ohio, Pennsylvania, Rhode Island, Vermont, Washington, Wisconsin.

The Box Bill.—The second outstanding legislative feature of the year is associated with the Federal control of Immigration. The Box Bill, which provided for the limitation of Mexican immigration, was reported to the Seventieth Congress, after extensive hearings before the House Committee on Immigration and Naturalization. However, the Seventieth Congress failed to enact this Bill, and it has been re-introduced for reconsideration by the Seventy-first Congress.

BIOLOGICAL BASIS OF HUMAN WELFARE

The review of current race-conditions in the United States and the reaction of the American people toward them, indicates that during the year there has been an appreciable development in the eugenical ideals of the nation. The people are becoming more inclined than formerly to look upon and to deal with such matters as immigration, race-crossing, mate selection and differential fecundity from the standpoint of hereditary quality of future generations of Americans.

IMMIGRATION PROBLEMS

By Peter F. Snyder

Assistant to the Secretary of Labor

ANALYSIS OF IMMIGRATION

Admissions and Departures.—Recent immigration figures are the smallest since 1919, and show a decline of 9 per cent since last year. In the fiscal year ended June 30, 1929, a total of 479,327 aliens were admitted to the United States, as compared with a total of 500,631 aliens for the previous year. During the fiscal year 252,498 aliens departed, as compared with 274,356 departures during 1928. Therefore, for the past fiscal year there was a net gain of 226,829 as compared with a net gain of 226,275 aliens for 1928. Of 479,327 aliens admitted, 279,678 were immigrants or newcomers for permanent residence in this country and 199,649 were either returning from a temporary trip abroad or coming here for a visit. Of the 252,498 aliens who departed from the United States during the past year, 183,295 were aliens who had been here for a short stay or who intended to return to the United States after visiting a foreign country. The remaining 69,203 departed without expressing an intention to return.

Classification.—About three-fourths of the present-day immigrant aliens are in the prime of life, 16 to 44 years of age, which percentage runs about the same as in the previous fiscal year. Of the immigrants admitted during the year, 207,990 were from 16 to 44 years of age, 47,935 were under 16 years of age and the remaining 23,753 were 45 years of age or over. During the previous fiscal year the male immigrants outnumbered the female immigrants, 165,977 males and 141,278 females being admitted in that year. Again, during the fiscal year 1929 the males outnumbered the females, 142,132 males and 137,546 females being admitted. However, a number of countries sent more females than males. For instance, Greece sent 408 males and 1,858 females and Italy sent 6,201 males and 11,807 females. Statistics show that most of the countries sending an excess of females over males are located in southern Europe where the quotas are small. The excessive females over males is due largely to the fact that many of these females are wives of American citizens and as such are exempt from the quota provisions of the immigration act of 1924.

Immigration Sources.—As in the previous fiscal year, countries from the Western Hemisphere furnished almost 41 per cent of the immigrants admitted, due to the fact that quota restrictions do not apply to most countries in this hemisphere. Immigrants to the number of 64,440 were admitted from Canada and 40,154 from Mexico. These two figures constitute 37 per cent of the total number of immigrants for the year. Europe sent 158,598 immigrants during the year, Germany leading with 46,751, being followed by the Irish Free State with 17,672 and Great Britain with 21,327. Italy sent 18,008 and the combined Scandinavian countries (Denmark, Norway, and Sweden) 17,379.

Restrictive Effects.—A study of the following figures will show what a tremendous effect the present restrictive immigration laws have. In a single year prior to the war, and of course prior to the first quota law, which was passed in 1921, immigration exceeded the million mark. A larger number of aliens arrived during individual years in that period from single countries in Europe than now come from the entire Continent. For example, in 1913 the then Russian Empire contributed 291,040 immigrants to this country; Italy, 265,542, and former Austria-Hungary 254,825, whereas in the fiscal year just passed only 158,598 alien immigrants were admitted from all European countries.

CHINESE ALIENS

Admissions.—The number of Chinese admitted during the year was 8,018, of which number 1,071 were immigrants, and 6,947 were non-immigrants. Of this latter number 4,507 were passing in transit through the United States and 519 were entering as temporary visitors. In the previous fiscal year, 7,996 were admitted, 931 being immigrants and 7,065 being non-immigrants. It will, therefore, be seen that there was a slightly greater number of Chinese aliens who came to the United States during the past year than during the preceding year. Chinese numbering 8,886 departed during the past year as compared with 9,357 the previous year.

Citizenship Claims. — The main problem in connection with Chinese immigration has to do, not with alien Chinese, but with Chinese who claim American citizenship. While a considerable number of alleged citizens claiming birth in the United States apply for readmission, for the most part citizen applicants are those who claim to be citizens by reason of the birth of their alleged fathers in this country. There applied for admission during the fiscal year 3,534 Chinese who claimed citizenship as against 3,352 of this class who applied for admission during the fiscal year 1928. In order to determine the truth of the claims of these applicants, the Immigration authorities are confronted with the difficult task of determining the relationship of an applicant to his alleged father when birth is said to have occurred in China.

DEPORTATION OF ALIENS

The expulsion of undesirable aliens from the country continues to be one of the most important functions of the Immigration Service. The classes of aliens subject to deportation include criminals, anarchists, insane and feeble-minded aliens, aliens who have become public charges, and the like. During the past fiscal year a total of 12,908 aliens were arrested and formally deported, as compared with 11,625 for the preceding year and 11,662 for the fiscal year ending June 30, 1927. Of the past year's deportees, 12,908, 4,227 were deported to Europe, 2,185 to Canada, 5,481 to Mexico, 570 to other countries of the Western Hemisphere, 370 to Asia, and 75 to

Africa, Australia, and the Pacific Islands.

The number of aliens deported for the past year was larger than the number deported for the previous year, during which year the number of deportations was the largest ever handled by the Immigration Service in a single year. In addition to the 12,908 aliens actually deported there were 25,888 subject to deportation who departed in order to avoid formal deportation, as compared with 19,946 such departures for the previous year. From this it will be seen that the total number of deportable aliens whose removal from the country was brought about during the past fiscal year exceeded by 7,225 the number of such departures during the previous fiscal year, which means that in the fiscal year just passed the Immigration Service was responsible for the removal from the country of more deportable aliens than during any previous fiscal year.

BORDER PROBLEMS

Arrests and Seizures.—The Immigration Border Patrol apprehended 34,591 persons of all kinds found engaged in unlawful or questionable activities. Of these 33,002 were turned over to examiners of the Immigration Service, of which 29,568 were smuggled aliens and 291 were found to be smugglers of aliens. There were turned over to the customs service 848 persons; to the Prohibition Unit, 117 persons; to State and municipal authorities, 515; and to other branches of the Government 109 persons. Seizures were made of 741 automobiles at an estimated value of $271,999, and of 222 other conveyances at an estimated value of $27,852. Liquor aggregating 352,869 quarts estimated at a value of $337,769, and miscellaneous contraband goods valued at $58,158 were seized by patrolmen and delivered to the appropriate governmental agencies concerned.

Border Patrol.—Each year since its establishment the Border Patrol has made tremendous strides in the development of its efficiency. The organization is recruited by means of competitive examinations from the finest type of young manhood in the country. The work is arduous, exacting, and oftentimes hazardous in the extreme, calling for the exercise of initiative, resourcefulness, discretion, courtesy and patience. Uncompromising honesty, intelligence, ambition, industry and courage are required. Ten members of the organization have lost their lives in encounters with outlaws since 1924.

LAW ADMINISTRATION

Labor Visas Upheld.—Two decisions highly important in the administration of the immigration laws were handed down by the United States Supreme Court during the past year. Growing out of Labor Department General Order No. 86, issued April 1, 1927, there arose the case of Mary Cook and Antonio Danelon *v.* Karnuth. Under General Order No. 86 alien residents of foreign contiguous territory coming or seeking to come to the United States to pursue employment in border communities were required to produce immigration visas, quota or nonquota. Had this General Order been invalidated by court decisions, great difficulty in the enforcement of immigration laws would have been encountered. However, the case was decided favorably to the Government, the Supreme Court holding that such aliens are not entitled to exemption as business visitors but must be considered as immigrants. This has partially solved the so-called border crossing problem and eliminated a considerable difficulty in the enforcement of the immigration laws.

Reentry of Alien Seamen.—For many years the courts have differed in opinion upon the question "whether an alien seaman residing in the United States who departed therefrom as a member of a crew of an American vessel on a round-trip foreign 'entered' the United States within the meaning of the immigration laws when he returned from the voyage." Some held to the view that an alien seaman did not so "enter" the United States as to render himself subject to the jurisdiction of the immigration laws on returning from a foreign voyage upon an American vessel. The question was settled by the Supreme Court in the Case of Claussen *v.* Day (49 S. Ct. 354). The court held that when an alien has departed on a foreign voyage to, and touched at, South American or other foreign ports he has made an entry into the United States within the meaning of the immigration laws when he has returned from such a round trip voyage. Essentially, this means that the consideration of a case of an alien alleged to be unlawfully in the country is based upon his last entry no matter how many previous entries he may have had or under what circumstances he may have come originally.

LEGISLATION

Family Considerations.—The hardships by reason of families separated when certain members left Europe for America are gradually being wiped out by reunion in the United States. Many cases have been automatically cared for by reaching them within the regular quota classes; and by preferences to certain members of American citizen families. May 29, 1928, an act was passed giving preference also to wives and minor children of legally resident aliens, and nonquota status to husbands of American citizens married prior to June 1, 1928. More than a year's experience with this statute has demonstrated its practicability. Without increasing the gross migration from Europe it has eliminated the hardships attendant on the separation of thousands of families. Further, it has deferred the planting of new immigrant stock in the United States by encouraging the immigration of aliens in the direct line of family relationship and postponing the entry of collateral relatives and persons having no family ties here.

Selective Principle.—The Secretary of Labor has again recommended to Congress extension of the selective principle of immigration by preferences to certain needed workers. He expresses his conviction that our present system of immigration control is lacking in this important particular. He does not propose to increase the present quotas but would give a new preference to immigrants who are needed here, thus expediting the entry of aliens whose services are necessary to the American economic fabric. The Secretary of Labor further recommends modification of the drastic exclusion Act of March 4, 1929, which forbids the reentry of any person who has been expelled or ordered expelled from the country.

Amendments.—The Commissioner General of Immigration has suggested twenty-two amendments to the laws, principally for administrative facility, but including also repeal of the national origin provision, more liberality toward aged parents of citizens, stepchildren of American citizens, and political refugees, geniuses, etc.

THE QUOTA SYSTEM

BY HARRY E. HULL

COMMISSIONER-GENERAL OF IMMIGRATION, DEPARTMENT OF LABOR

NATIONAL ORIGIN

Quota Limitations.—The so-called national-origin plan of quota limitations upon immigration became operative July 1, 1929, after repeated attempts to repeal or postpone this measure had failed in Congress. The present plan permits the admission of 153,714 quota immigrants as compared with 164,667, authorized under the quotas based on the 1890 census which were in effect since July 1, 1924, or during a five year period. Under the plan now in operation an annual reduction of about 11,000, a relatively small number, of quota immigrants is contemplated. The following table shows by comparative figures the loss or gain to the countries affected under the present quota plan.

QUOTA GAINS

Number of quota immigrants:

	Old Plan	*New Plan*
Austria	785	1,413
Belgium	512	1,304
Finland	471	569
Great Britain and North. Ireland	34,007	65,721
Greece	100	307
Hungary	473	869
Italy	3,845	5,802
Latvia	142	236
Netherlands	1,648	3,153
Poland	5,982	6,524
Russia	2,248	2,784
Spain	131	252
Turkey	100	226
Yugoslavia	671	845

QUOTA LOSSES

Number of quota immigrants:

	Old Plan	*New Plan*
Czechoslovakia	3,073	2,874
Danzig	228	100
Denmark	2,789	1,181
France	3,954	3,086
Germany	51,227	25,957
Irish Free State	28,567	17,853
Norway	6,453	2,377
Portugal	503	440
Rumania	603	295
Sweden	9,561	3,314
Switzerland	2,081	1,707

Countries not listed above have not been affected by the change in the quota plan to any appreciable extent or not at all.

THE IMMIGRATION MOVEMENT

Admissions.—During the fiscal year ending June 30, 1929, a total of 479,327 aliens were admitted, including 199,649 of the non-immigrant class consisting mostly of aliens returning from a temporary sojourn abroad or coming here for a visit. During the same period 252,498 aliens left this country. Thus the net gain in the population of the United States resulting from immigration of aliens is 226,829, which figure is almost identical with that for the fiscal year of 1928, during which period the net gain from the same source amounted to 226,275. These figures indicate that we have now a problem of assimilating approximately one quarter of a million of aliens annually, a sweeping reduction, unquestionably brought about by the quota system, as compared with the figure of 650,000 representing the annual average addition to our alien population during 1910-1914, the five year pre-war period when immigration reached its high water mark. During the past fiscal year about 60,000,000 entrants including U. S. citizens, commuters, excursionists and visitors, who crossed and recrossed our Northern and Southern borders, were examined by officers of the Immigration Service.

Quota Immigrants.—During the past year 146,918 quota immigrants were admitted out of a total of 164,667 permitted under the old quota plan, indicating an unused balance of approximately 18,000. Most of the principal countries, excepting the Irish Free State with a balance of over 6000, have exhausted their annual quotas. The Joint Resolution of May 26, 1929, designed to preserve the family entity, is responsible for the admission of about 32% of preference quota immigrants out of the total of quota immigrants who came to this country during the past year. This percentage compares with the figure of approximately 16% representing the number of same class of immigrants during 1928 or before the enactment of the liberalized amendment in favor of certain members of the immediate family of United States citizens and lawfully domiciled aliens. Certain countries, including Czechoslovakia, Hungary, Italy, Poland, Rumania, and Russia used from 90% to 100% of their respective quotas to enable the quota preference immigrants to join their close relatives here, while the results affecting the same class of immigrants register approximately 20% for Germany, 25% for Great Britain, only 1% for the Irish Free State and 50% for the Scandinavian countries and the Netherlands. On the whole it is clearly manifest that the new provision of the law, while fully conserving the original limitations as to the total of quota immigrants, operates successfully as a humanizing element reducing to a minimum hardships which usually attend separation of families.

Nonquota Immigrants.—Under our present quota system, natives of Canada, Newfoundland and of all independent countries located on the North and South American continents as well as on adjacent islands, are exempt from numerical restrictions. During the past year 97,251 of this class of immigrants came to the United States.

Canada and Mexico.—During 1929, Canada furnished 64,440, including quota and nonquota immigrants, as compared with 73,154 of this class of newcomers who entered in 1928. The figures for Mexico dealing with the same subject register 40,154 for 1929, as compared with 59,016 for the preceding year. This substantial reduction of approximately 33% in the immigration from Mexico is particularly significant in view of the present agitation in favor of placing a quota on the latter country.

Reentry Permits.—Aliens lawfully admitted for permanent residence in the United States may be granted reentry permits for the purpose of facilitating their readmission to the United States, regardless of quota restrictions, upon their return to this country after a temporary sojourn abroad. About 150,000 such permits were granted during the past year.

EXCLUSIONS

A total of 18,127 aliens were debarred during the past year on various grounds defined by law. The lack of consular immigration visas required by the quota Act was responsible for the exclusion of 15,509 aliens examined at the land border ports, while only 1,828 were debarred at the various seaports. The wide discrepancy between exclusion results at the border ports and at seaports is explained by the fact that transportation companies bringing aliens to the United States from trans-oceanic countries are subject to heavy fines for bringing certain inadmissible aliens, including those not in possession of the required immigration visas, whereas no such penalty is provided under law in case of transportation companies bringing aliens from foreign contiguous territory. Moreover the system now in operation for the past four years under which persons applying for immigration visas at American Consulates, located in most European countries, are accorded a preliminary examination by officers of the Immigration Service, as well as by medical officers of the U. S. Public Health Service, in order to prevent as far as possible the embarkation for the United States of inadmissible aliens, is also responsible for the better results at the seaports. This weeding out system, intended to obviate hardships to individuals in the event of deportation, is largely responsible for the fewer exclusions at the seaports to a minimum or a fraction of 1% of the total trans-oceanic arrivals.

ALIEN SEAMEN

The alien seaman problem remains still unsolved. Under special exemptions of the law this class of aliens, which includes all persons employed in any capacity aboard a vessel, may be accorded shore leave and other privileges not extended to applicants for admission to the United States. This is responsible for a large number of desertions among alien seamen who through these exceptional facilities gain an unlawful residence in the United States. These surreptitious landings have been greatly increased with the enactment of quota restrictions. During the past year approximately 38,000 vessels coming from foreign ports were inspected by officers of the Immigration Service. In this connection about 1,100,000 seamen were examined, of this number about 11,000 alien seamen were reported as deserting. Of this number about 800 were Orientals.

LEGISLATION

Certificates of Registry.—One of the most important pieces of legislation affecting alien residents was adopted March 2, 1929. This Act enables certain aliens who entered the United States prior to June 3, 1921, the date of the first Quota Act, but of whose lawful admission there is no record, to register their entry and thereby to legalize their stay in this country. An applicant for such certificate of registry is required to show (1) that he is not ineligible to citizenship; (2) that there is no record of his admission for permanent residence; (3) that he entered the United States prior to June 3, 1921; (4)

that he has resided in the United States continuously since such entry; (5) that he is a person of good moral character; and (6) that he is not subject to deportation. The applicant must support his claim that he entered this country prior to June 3, 1921, and that he resided here continuously since then, by sworn statements from at least two credible witnesses who are American citizens. A fee of $20 is provided for the issuance of the certificate of registry, which is to serve as a record of landing for naturalization purposes, or in connection with reentry permits. It is difficult to estimate the number of aliens who are eligible or who may avail themselves of this new provision of the law. Judging, however, from the record of July, 1929, the first month of the law's operation, when almost 2,700 applications for registry were filed, it is apparent that another major task has been added to the manifold activities of the Immigration Service.

Deportees Who Reenter.—On March 4, 1929, a much needed measure providing for imprisonment not to exceed two years or fine not exceeding $1,000 or both, in cases of aliens who return to the United States after having been arrested and deported at any time, became law. Hertofore deportation implied no penalty or great hardship to a considerable number of aliens, particularly seamen, who experienced little difficulty in repeatedly reentering this country. In many instances deportation was welcomed as a convenient means of returning to one's own country without expense to the deportee. The same act also penalizes by imprisonment for not more than one year or by fine of not more than $1,000, or both, any alien who enters the United States surreptitiously. It also prohibits the admission at any time in the future of an alien who has been arrested and deported and revokes the authority formerly vested in the Secretary of Labor to grant permission to reapply to such aliens previously deported. It is feared that this new provision of the law is possibly too drastic and will cause undue hardships in deserving cases, particularly where separation of family is involved.

BORDER COMMUTERS

In order to effect a better control of aliens crossing daily from Canada and Mexico in pursuance of their employment in the United States while residing across the Border, the Secretary of Labor ruled on April 1, 1927, that such aliens be regarded as "immigrants," and that all the provisions of the law applying to this class of aliens be enforced, including requirements of immigration visa and payment of head tax. These provisions have been embodied in General Order No. 86 and affect many thousands of aliens living in Canada and Mexican localities situated in closs proximity to important industrial centers in the United States, like Niagara Falls, Buffalo, Detroit, etc., where these aliens were employed. Persons born in Canada and Mexico, being natives of nonquota countries, had no difficulty to qualify under the new order. Natives of other countries, however, to whom quota restrictions apply, were barred in most instances from crossing the borders for the purpose of either seeking or continuing employment in the United States.

A decision subsequently rendered by the Circuit Court of Appeals, Second Circuit, New York, based on an interpretation of the so-called Jay treaty concluded between this country and Great Britain in 1794 practically invalidated General Order No. 86 by holding that the aliens involved are not to be regarded as "immigrants" and declaring their right to "pass and repass" the boundary lines. This decision which during its application seriously threatened to defeat the intent of the quota provisions of the law, was reversed by a decision of the United States Supreme Court rendered April 8, 1929, thereby relieving the Immigration Service of a most vexatious problem.

COST OF IMMIGRATION SERVICE

During the twenty-two year period from 1907 to 1928 the Immigration Service collected from head taxes on aliens administrative fines imposed upon transportation companies for bringing undesirable aliens and from other sources the sum of $75,813,310. The cost of maintaining the Immigration Service during the same period amounted to $80,104,753. In other words only $4,191,443 during the entire period or an annual average of less than $200,000 was taken from the pockets of the American taxpayer to support this highly protective arm of the Government. Close students of our alien problem have come to the conclusion that a more liberal financing of the Immigration Service constitutes one of the best remedies for the correction of this problem.

CITIZENSHIP AND NATURALIZATION

By Raymond F. Crist

Commissioner of Naturalization, Department of Labor

CITIZENSHIP

Status by Naturalization.—The fundamental authority for citizenship in the United States rests upon two provisions in the Constitution (see American Year Book, 1928). The status of citizenship by naturalization is a conditional one, both under the provisions of the Constitution and the statutes applicable thereto. It differs from the citizenship of the native in that presumption of expatriation may ensue upon an absence of two years from the United States with residence in the State of former allegiance or upon five years' absence in any other foreign State. Such presumption may be overcome by action under rules of the Department of State through diplomatic or consular officers of the United States. Again, fraud in the naturalization is presumed if the newly naturalized citizen shall establish a permanent foreign residence within five years of acquisition of American citizenship. Such a course is *prima facie* evidence of an act of sufficient gravity to justify the institution of a suit by the Government to set aside the citizenship as fraudulently acquired, since permanent residence within the United States is a condition precedent to naturalization. Citizenship will terminate, whether the individual be native or naturalized, upon the taking of an oath of allegiance to any foreign sovereignty, notwithstanding that foreign citizenship shall not be vested consequent upon that act. Likewise expatriation follows acquisition of full foreign citizenship. No one can be a citizen of two countries.

Acquirement of Citizenship.—Citizenship has been quite uniformly conferred in the United States by the judicial process, and when so conferred the judicial proceeding is a case within the meaning of the Constitution, although the litigation is to determine a status and to grant or deny a favor and not adjudicate a right. Citizenship has, however, been collectively conferred by Congress upon large numbers through its treaty-making powers in the acquisition of territory, and upon the admission of portions of such acquired territory to statehood. Citizenship has also been conferred upon the inhabitants of acquired territory by legislative enactments in the absence of definite treaty stipulations and prior to admission to statehood. Native-born American Indians were admitted to citizenship through tribal treaties prior to 1871, and by the Act of June 2, 1924 (43 Stat. 253), all native Indians were given citizenship.

MACHINERY OF NATURALIZATION

Limitations.—Naturalization is not open to all races but is limited to those who come within the language of Section 2169 of the Revised Statutes of the United States. The limitations of this section are to aliens being free white persons and those of African nativity and to persons of African descent. Within such limitation the Act of June 29, 1906 (34 Stat. 596), as amended, and the Act of September 22, 1922 (42 Stat. 1021), confine their field of operation and constitute the major laws of the United States on the question of naturalization.

Canal Zone and Philippine Islands.—Naturalization is not conferred in the Philippine Islands, the Canal Zone, nor any of the insular possessions except Porto Rico and the Virgin Islands. Citizenship in the Philippine Islands is conferred upon aliens resident in those islands under the Philippine naturalization law of 1920. Citizens of the Philippine Islands are not citizens of the United States but owe allegiance thereto.

Judicial Jurisdiction.—Congress has conferred jurisdiction to administer the naturalization law upon State Courts which have a seal and clerk and jurisdiction in actions at law or equity, or law and equity, in which the amount in controversy is unlimited. These State Courts are thereby made Federal agencies with jurisdiction coördinate with that of the District Courts of the United States. Courts of the Territories of Alaska and Hawaii of like territorial jurisdiction have been similarly empowered by Congress. In Porto Rico the United States District Court has had jurisdiction since March 2, 1917. The District Court of the Virgin Islands was clothed with similar jurisdiction on February 25, 1927, when Congress conferred United States citizenship upon certain inhabitants of the Virgin Islands and extended the naturalization laws to those islands. In the naturalization proceedings in all of these courts the United States is represented by appointees of the Secretary of Labor on the recommendation of the Commissioner of Naturalization.

Bureau of Naturalization.—Administration of the Acts of June 29, 1906, as amended, and of September 22, 1922, and some minor acts, which comprise the entire naturalization code, is reposed in the central Federal Bureau of Naturalization in the Department of Labor. The bureau accomplishes the administration of these laws through the field service with branches located in 38 cities throughout the United States, including Alaska, Hawaii, Porto Rico, and the Virgin Islands, subject to the direction of the Commissioner of Naturalization from administrative headquarters in Washington.

NATURALIZATION PROBLEMS

Alien Population.—The naturalization problem in this country is the largest and most complicated of any like problem in any other country and larger probably than in all other countries combined. This problem arises out of the millions of persons of foreign birth who have sought the opportunities which this country offers through its wonderful resources. The Census Report for 1920 is the latest available authority for the alien-born persons in the United States. At that time they numbered 13,920,692, including men, women, and children. The unnaturalized were shown to be 5,398,605. Not included in this total were 1,223,490 who had taken the first step towards citizenship and secured their "first papers." These two groups aggregated 6,622,095, or nearly one-half of the foreign born. Somewhat uncertainly connected with the problem were 805,509 individuals regarding whose citizenship status it was impossible to ascertain whether or not they had divested themselves of their foreign allegiance. Assembling these three groups together, the total of 7,427,604 leaves less than one-half of the total foreign population, or 6,493,088, who had acquired citizenship.

NATURALIZATION PROCEDURE

New Legislation.—On March 2, 1929, Congress enacted legislation further amending the Act of June 29, 1906, which made definite changes in the naturalization procedure and enlarged the scope and provisions of the naturalization law. The changes brought about by this legislation, together with the procedure continuing under prior acts that have not been repealed or modified are here presented.

Process of Application.—Citizenship as ordinarily conferred upon persons of foreign birth is by judicial procedure. The first step in this proceeding is, however, ministerial, and consists in applying for a "certificate of arrival" to show the date, place, and manner of arrival in the United States of the intending applicant for citizenship. Such an application is made to the field naturalization office within whose territory the applicant resides. Accompanying this application must be the fee for the certificate of arrival and two photographs of the applicant. The certificate of arrival is issued upon the confirmation of the alleged arrival through examination of the immigration records for the port through which the alien was admitted into the United States. The admission must have been for permanent residence. Should there prove to be no record showing the arrival of the alien, he may, if arrival occurred prior to June 3, 1921, apply to the immigration authorities nearest his place of residence to have a record made of his entry and his status declared that of lawful admission for permanent residence.

Judicial Action.—The applicant then proceeds to secure from the clerk of the court within whose jurisdiction he resides the "first paper," or declaration of intention to become a citizen of the United States within seven years from the date of such declaration. This action occurs in any of the courts empowered to naturalize aliens within whose jurisdiction the alien may reside. The final step is filing the petition to the court for admission to citizenship and the hearing of the petition by the court. If granted citizenship by the court, the petitioner is required to abjure all allegiance by name to the sovereignty of which he is a citizen or subject and all others in general, and to take the oath of allegiance to the United States. A certificate of citizenship is issued to the new citizen and is popularly known as the "second paper." A photograph of the applicant is required to be affixed to the certificate of citizenship as well as to the "first paper" of application.

Residential Requirements.—A person of foreign birth must have been admitted to the United States for permanent residence under the immigration laws in force at the time of his arrival in order to be eligible to take valid action towards the acquisition of American citizenship. Five years after such admission, if at that time the individual should be possessed of a declaration of intention made by him at least two years before, he may proceed to file his petition for naturalization. He must obtain from the Department of Labor a certificate showing the date, place, and manner of his arrival in the United States immediately prior to petitioning for filing with the clerk of the court. If the certificate were obtained prior to the making of the declaration of intention it will be available for use in petitioning. This certificate is issued from the record made by the immigration authorities at the time of arrival.

The petition for naturalization must be completed by two citizens of the United States who serve as subscribing witnesses and testify before the court as to the residence and good moral character of the petitioner during so much of the five-year period as they have known him immediately preceding the date of the petition. Only six months' residence within the county is required of the applicant to make him eligible to petition the court for admission to citizenship. Two witnesses ordinarily are required, but if, because of residence in two or more places in the county, two witnesses cannot be procured to testify to all of such county residence, other witnesses may be used by him to substantiate the remaining county residence. Residence outside of the county and good moral character may be established by depositions, which must be taken before naturalization examiners. No fee is charged for these depositions. A petition filed under the general provisions of the naturalization law may not be heard until after 90 days from the date it is filed. In addition to this, it must be posted publicly for a like period, with the date, as near as may be shown, for the hearing of the petition. Naturalization is prohibited during the 30 days preceding the holding of an election general to the jurisdiction of the court.

There are some exceptions to these general provisions which favor soldiers, sailors, enlisted men in the Navy and the Marine Corps, in whose behalf Congress has permitted the filing of petitions in any convenient court and to have them come on for summary hearing if the applicants have been examined by the Naturalization Service on behalf of the United States Government. By the act of March 4, 1929, Congress permitted aliens who had served in the American military forces during the World War to secure citizenship by naturalization on summary hearing before a naturalization examiner and the most convenient court, and without the payment of the usual naturalization fees.

Naturalization Fees.—These were changed by the legislation referred to and the new schedule adopted is as follows: Certificate of arrival, $5, payable to the Commissioner of Naturalization; declaration of intention, $5, and petition for citizenship, $10, payable to the clerk of the court at the time action is taken. Where there is no record and the alien arrived prior to June 3, 1921, the immigration authorities will make a record of the entry of such alien upon satisfactory evidence, for which a fee of $20 is payable to the Commissioner General of Immigration.

PETITIONS AND GRANTS

There have been 5,860,107 declarations of intention made by candidates for citizenship, and 2,844,520 certificates of naturalization granted upon the 3,316,546 petitions for naturalization filed by applicants for citizenship since the Act of June 29, 1906, became operative, and up to and including June 30, 1929. During the year 1929, there were 280,645 declarations of intention made, of which 207,149 were by men and 73,496 by women of foreign birth. A total of 255,519 petitioned for admission to citizenship, included in which 185,616 petitions were made by men and 69,903 by women. There were 224,728 who received certificates of citizenship, and of these 57,063 were presented to women, this constituting the largest record of naturalization of women in any year in the history of the administration of the naturalization law. The remaining 167,665 certificates were granted to men.

The table which follows shows the nationalities of those admitted to citizenship during the year:

NATURALIZED PERSONS

(Fiscal Year, 1928-29)

Country		*Number*
Repatriated Americans		4,143
Italy		44,854
British Empire:		
Ireland	13,162	
England	9,697	
Canada	8,223	
Scotland	6,218	
Wales	514	
Australia	133	
Others	3,067	
Total British Empire	41,139	
Poland		31,805
Russia		18,316
Germany		16,722
Czechoslovakia		9,215
Greece		6,266
Sweden		5,986
Rumania		5,818
Serbs, Croats and Slovenes		5,583
Hungary		4,824
Austria		4,160
Turkey		3,611
Norway		3,395
Lithuania		3,249
Denmark		2,109
Netherlands		2,107
Switzerland		1,933
Finland		1,465
France		1,247
Syria and the Lebanon		1,089
Belgium		1,014
Spain		857
Latvia		853
Portugal		790
Albania		510
Bulgaria		273
Palestine		194
Mexico		164
Persia		126
Brazil		120
Esthonia		112
Luxemburg		110
Miscellaneous		569
Total		224,728

SPECIAL NATURALIZATION

Women.—On September 22, 1922, Congress passed a law which required women to become citizens independently of the action of their husbands. This law repealed the provisions of the laws by which the wife became a citizen upon the naturalization of her husband and by which she lost her citizenship upon marriage to an alien. Since that time there have been 364,960 women who have made the declaration of intention to become citizens of the United States. There were 249,388 women who filed petitions for naturalization and 206,442 who have been admitted to citizenship, of which 57,063, or over one-fourth, were naturalized in 1929.

Exemptions to World War Veterans.—The act of Congress of May 26, 1929, which gave exemptions to veterans of the United States military forces of the World War, expired on May 25, 1928. Through the Act of March 4, 1929, Congress renewed these exemptions. Under this Act there were 518 who were naturalized by the end of the fiscal year June 30, 1929. This number added to those previously naturalized brings the total up to 298,766.

IMMIGRATION VISAS

The Immigration Act of 1924 requires each "immigrant" to obtain an immigration visa before departing for the United States for permanent residence. These visas are in the custody of the Bureau of Naturalization and constitute records to which reference is made to prove the claim of legal admission that will entitle an alien who arrived in the United States on or after July 1, 1924, to proceed to naturalization. There were 286,665 visas received in the Bureau of Naturalization in 1929, which added to those previously received made a total of 1,534,247.

CITIZENSHIP TRAINING

The Federal Textbook on Citizenship Training, prepared to provide a complete course of study for adults of foreign birth, leading from appropriate elementary lessons in English to a brief history of the United States with special reference to the form of government, and including practical lessons on citizenship in local communities, is furnished to candidates for naturalization who attend public school classes. Public school officials in 352 communities submitted information regarding enrollment of this class of students and requested appropriate textbooks during the year 1929, the number furnished being as follows: Part I, Our Language, 12,838; Part II, Our Community, 8707; Part III, Our Nation, 9491.

POPULATION STATISTICS

By Leon E. Truesdell

Chief Statistician for Population, U. S. Bureau of the Census

---

CONTINENTAL UNITED STATES

Summary of Census Figures.—The growth of the population since the first census in 1790 is indicated by the table, page 484, which gives the figures for each census, with an unofficial estimate for January 1, 1930.

Population Growth.—The estimated population of Continental United States on Jan. 1, 1930, was 122,537,000, as compared with 105,710,620 on Jan. 1, 1920, the date of the last actual census of population. This estimate represents an increase of 15.9 per cent for the 10 years. The increase for the period between the censuses of 1910 and 1920 amounted to 14.9 per cent, which would be equivalent to 15.4 per cent in a complete decade.

BIRTHS AND DEATHS

Registration Area.—Among the most fundamental of the current statistics relating to population are those of births and deaths. Neither birth registration nor death registration has yet reached such a stage of development in all of the states of the Union that the figures are considered satisfactory for compilation by the Census Bureau. The registration area, which is made up of states having

POPULATION OF THE UNITED STATES

(Census figures, 1790 to 1920: estimate for 1930.)

Year	Population	Increase Over Preceding Census	
		Number	Per Cent
1930	122,537,000	16,826,380	15.9
1920	105,710,620	13,738,354	14.9
1910	91,972,266	15,977,691	21.0
1900	75,994,575	13,046,861	20.7
1890	62,947,714	12,791,931	25.5
1880	50,155,783	11,597,412	30.1
1870	38,558,371	7,115,050	22.6
1860	31,443,321	8,251,445	35.6
1850	23,191,876	6,122,423	35.9
1840	17,069,453	4,203,433	32.7
1830	12,866,020	3,227,567	33.5
1820	9,638,453	2,398,572	33.1
1810	7,239,881	1,931,398	36.4
1800	5,308,483	1,379,269	35.1
1790	3,929,214	....	...

satisfactory registration systems, is being gradually extended, however, until it now (December, 1929) includes all but 2 of the states and more than 95 per cent of the population. Beginning with 1925, it has been considered that the returns for births and deaths were sufficiently complete to justify their use as a basis for estimating the increases from year to year in the population of the United States.

Summary of Recent Data.—The following table gives for each year from 1920 to 1928 the number of births and deaths, the annual rates per 1,000 of the population, and a 3-year moving average rate, which indicates the trend with much less variation on account of fortuitous conditions than the single-year rates:

BIRTHS AND DEATHS IN THE REGISTRATION AREA

(1920 to 1928)

(The birth registration area included 59.8 per cent of the total population of the country in 1920 and 94.4 per cent in 1928; the death registration area included 82.2 per cent of the population in 1920 and 95.4 per cent in 1928.)

Year	Births			Deaths		
	Number	Rate per 1,000 of the Population		Number	Rate per 1,000 of the Population	
		Annual	3-year Moving Average		Annual	3-year Moving Average
1928	2,233,149	19.7	...	1,378,675	12.0	...
1927	2,137,836	20.6	20.3	1,236,949	11.4	11.9
1926	1,856,068	20.6	20.9	1,285,927	12.2	11.8
1925	1,878,880	21.4	21.6	1,219,019	11.8	12.0
1924	1,930,614	22.6	22.2	1,173,990	11.8	12.0
1923	1,792,646	22.4	22.5	1,193,017	12.3	12.0
1922	1,774,911	22.5	23.1	1,101,863	11.8	11.9
1921	1,714,261	24.3	23.5	1,032,009	11.6	12.2
1920	1,508,874	23.7	...	1,142,558	13.1	...

FUTURE POPULATION GROWTH

Indications from Present Rates of Increase.—Current interest is lively in the probable growth of the population of the United States over a considerable period, though the relations between this growth and the problem of the farm surplus, for example, or of the expanding market for manufactured products, constitute a field as yet little exploited. It is becoming evident that the present rate of growth of around 1¼ per cent per year is not likely to continue for a very long period. In fact, experts attacking the problem by two distinct methods have reached conclusions closely in agreement, to the effect that before the end of the present century population will have almost ceased to grow and that it will become nearly stationary somewhere between 180,000,000 and 190,000,000.

Declining Rate of Natural Increase.—Any forecast of the population for even a moderate way into the future must be affected seriously by recent trends in the birth and death rates, especially in the birth rate, which has decreased from 23.7 in 1920 to 19.7 in

1928. The death rate has also declined, though not as much, and as a net result the rate of natural increase (birth rate minus death rate) has declined from 11 per 1,000 in 1920 to 7.7 in 1928. The present low death rate (12 in 1928) cannot be long maintained, however, in view of the fact that the population is rather rapidly increasing in average age. In 1870 children under 10 years of age formed 39.2 per cent of the population; in 1920 only 31.7 per cent. In 1870 persons 65 years of age and over formed only 14.9 per cent of the population; in 1920, 20.8 per cent. The median age in 1870 was 20.1 years; in 1920, 25.2 years. The rate of natural increase, therefore, is almost sure to be cut into in the near future both by a decreasing birth rate and by an increasing death rate.

POPULATION CLASSIFICATIONS

Urban and Rural.—The published reports of the population census show the figures classified under about 20 different headings, of which space will permit the presentation here of only a few. Of the total population in 1920 (105,710,620), 51.4 per cent were living in urban territory, which comprises all cities and other incorporated places having 2,500 inhabitants or more; and 48.6 per cent were living in rural territory, that is, outside such incorporated places. The percentage urban in 1880, when this classifictation was first established, was only 28.6.

Farm Population.—The farm population, which was first shown separately in 1920, numbered 31,614,269, representing 29.9 per cent of the total population and 61.5 per cent of the rural population. The 1920 figures included certain farm laborers (and their families) not actually living on farms, estimated to number about 600,000. The farm-resident population in 1925, as returned in the farm census of that year, numbered 28,981,668, representing a decrease of about 2,000,000 as compared with 1920. Estimates made by the Department of Agriculture indicate that the decrease in the farm population has continued rather rapidly since 1925.

Sex, Age and Race.—Other important classifications of the 1920 population of the United States are as follows: by sex, 53,900,437 males and 51,810,189 females; by race, 94,820,915 white, 10,463,131 negro, and 426,574 of other races; by age, under 5 years 11,573,230; 5 to 14 years, 22,039,212; 15 to 24 years, 18,707,577; 25 to 44 years, 31,278,522; 45 to 64 years, 17,030,165; 65 years and over, 4,933,215, and age not reported, 148,699; white population by nativity, native white of native parentage, 58,421,957; native white of foreign or mixed parentage, 22,686,204, and foreign-born white 13,712,754.

MARRIAGE AND DIVORCE

Data.—Marriage and divorce figures have been compiled for various periods beginning with 1867 and have been published annually beginning with 1922. The following table summarizes the returns from the year 1922 to the year 1928.

MARRIAGES AND DIVORCES IN THE UNITED STATES

(1922 to 1928)

Year	Population (estimated as of July 1)	Marriages		Divorces		
		Number	Per 1,000 of Population	Number	Per 1,000 of Population	Per 100 Marriages Performed
1928	120,013,000	1,182,497	9.85	195,939	1.63	16.6
1927	118,628,000	1,201,053	10.12	192,037	1.62	16.0
1926	117,136,000	1,202,574	10.27	180,853	1.54	15.0
1925	115,378,000	1,188,334	10.30	175,449	1.52	14.8
1924	113,727,000	1,184,574	10.42	170,952	1.50	14.4
1923	111,693,000	1,229,784	11.01	165,096	1.48	13.4
1922	109,893,000	1,134,151	10.32	148,815	1.35	13.1

The number of marriages per thousand of the population shows a gradual though not a very rapid decrease. The number of divorces per thousand of the population, on the other hand, shows a continuous increase.

Classification of Divorces.—The divorces, as reported, are classified according to cause, party to whom granted, etc. Of the 192,342 divorces granted in 1928 for which detailed information was received 55,065 were granted to the husband and 137,277 to the wife. Classified according to cause: 16,217 were granted for adultery, 77,998 for cruelty, 57,996 for desertion, 3339 for drunkenness, 7883 for neglect to provide, and 28,908 for other causes and combinations of causes. Of the whole number of divorces, 167,020 were reported as uncontested. Cases where the parties had been married less than 5 years formed 36.1 per cent of the divorces and another 28.4 per cent was made up of cases where the parties had been married from 5 to 9 years. In only 70,991 cases, or 36.9 per cent of the total, was it reported that children were affected by the divorce.

COGNATE SOCIETIES

GENERAL

AMERICAN COLONIZATION SOCIETY, 516 Colorado Bldg., Washington, D. C.

CITIES CENSUS COMMITTEE, 200 Fifth Ave., New York City.

CITIZENS' COMMITTEE OF ONE THOUSAND, 100 Fifth Ave., New York City.

LEAGUE OF FOREIGN-BORN CITIZENS, 342 Madison Ave., New York City.

NATIONAL LIBERAL IMMIGRATION LEAGUE, 128 Madison Ave., New York City.

NATURALIZATION AID LEAGUE, 175 E. Broadway, New York City.

NORTH AMERICAN CIVIC LEAGUE FOR IMMIGRANTS, 289 Fourth Ave., New York City.

TRADE UNION IMMIGRATION BUREAU, 201 Second Ave., New York City.

RACES

ALLIED CITIZENS OF AMERICA, INC., 370 Seventh Ave., New York City.

AMERICAN ETHNOLOGICAL SOCIETY, American Museum of Natural History, N. Y. C.

AMERICAN INDIAN DEFENCE ASSN., INC., 221 W. 57th St., N. Y. C.

AMERICAN INDIAN LEAGUE, 24 E. 74th St., N. Y. C.

AMERICAN JEWISH COMMITTEE, 171 Madison Ave., New York City.

AMERICAN JEWISH CONGRESS, 33 West 42nd Street, New York City.

AMERICAN SCANDINAVIAN FOUNDATION, 25 W. 45th St., N. Y. C.

AMERICAN UNION OF ROUMANIAN JEWS, 799 Broadway, N. Y. C.

ASSOCIATION GENERALE DES ALSACIENS-LORRAINS d'AMERIQUE, 46 W. 46th St., N. Y. C.

ANCIENT ORDER OF HIBERNIANS, 937 W. 54th Place, Chicago, Ill.

BAVARIAN NATIONAL ASSN. OF N. A., 758 Broadway, Buffalo, N. Y.

CENTRO HISPANO-AMERICANO, 353 W. 17th St., New York City.

CENTRO VASCO AMERICANO SOCIETY, 48½ Cherry St., New York City.

ENGLISH-SPEAKING UNION OF THE U. S., 19 W. 44th St., New York City.

FÉDÉRATION DE L'ALLIANCE FRANÇAISE AUX ETATS UNIS ET AU CANADA, 32 Nassau St., N. Y. C.

FEDERATION OF HUNGARIAN JEWS IN AMERICA, 799 Broadway, New York City.

FEDERATION OF POLISH HEBREWS OF AMERICA, 32 Union Square, New York City.

FEDERATION OF RUSSIAN POLISH HEBREWS OF AMERICA, 1824 Lexington Ave., N. Y. C.

FOREIGN LANGUAGE PUBLISHERS' ASSN. OF THE U. S., INC., 110 E. 42nd St., N. Y. C.

FRANCE-AMERICA SOCIETY, INC., 270 Madison Ave., N. Y. C.

GENERAL NETHERLANDS ASSN. GROUP OF N. A., 179 S. Trenchard St., Yonkers, N. Y.

HEBREW SHELTERING AND IMMIGRANT AID SOCIETY OF AMERICA, 425 Lafayette St., N. Y. C.

HOLLAND SOCIETY OF N. Y., 90 West St., N. Y. C.

Huguenot Society of America, 2 W. 45th St., N. Y. C.

Hungarian Society of N. Y., 1440 Broadway, N. Y. C.

Indian Rights Assn., 995 Drexel Bldg., Philadelphia, Pa.

International Serbian Education Committee, 1049 Park Ave., N. Y. C.

Japanese Assn., Inc., 1775 Broadway, N. Y. C.

Jewish Congress Committee, 8 West 40th St., New York, N. Y.

Jewish National Workers' Alliance of America, 189 Second Ave., New York, N. Y.

Lake Mohonk Indian Conference, Smiley, Mohonk Lake, N. Y.

Lithuanian Alliance of America, 307 W. 30th St., New York, N. Y.

Loyal Serb Society Srbadiya, 443 W. 22nd St., New York, N. Y.

Mexican Society of New York, 16 E. 23rd St., New York, N. Y.

National Assn. for Advancement of Colored People, 69 Fifth Ave., New York, N. Y.

National Federation of Ukrainian Jews of America, Inc., 505 E. 82nd St., N. Y. C.

National Young Judea, 111 Fifth Ave., New York, N. Y.

Netherland American Foundation, 551 Fifth Ave., New York City.

Ordine Fieli D'Italia in America, 231 E. 14th St., New York City.

Polish Federation of New York City, Inc., 705 Courtlandt St., N. Y. C.

Polish National Alliance, 180 Second Ave., N. Y. C.

Russian National Society, 5 Columbus Circle, New York, N. Y.

Sons of Italy, 231 E. 14th St., New York, N. Y.

Thessalian Society, 667 Eighth Ave., New York, N. Y.

Ukrainian National Committee of the U. S., 30 E. 7th St., New York, N. Y.

United Roumanian Jews of America, Inc., 799 Broadway, New York, N. Y.

Universal Negro Improvement Assn. and African Commission League, 56 W. 135th St., N. Y. C.

Young Men's Hebrew Assn., 31 W. 110th St., New York, N. Y.

Zionist Organization of America, 111 Fifth Ave., New York, N. Y.

DIVISION XV

SOCIAL PROBLEMS AND CONDITIONS

CRIME CONDITIONS IN THE UNITED STATES

By Bennet Mead

United States Bureau of the Census

LACK OF STATISTICS

We still do not know definitely, from the available information, whether crime conditions in general are growing better or worse in the United States. We have no statistics for the country as a whole concerning the number of crimes known to the police. Such information, if compiled on an accurate and uniform basis, covering those offenses which are usually reported to the police, would give us a fair index of the prevalence of crime. Statistics of this sort have been compiled annually for many years in Great Britain, Canada, and other countries. But in the United States, at the present time, they are still available for only a few scattered cities. (See the writer's article, "Police Statistics," in "The Police and the Crime Problem." *The Annals of the American Academy of Political and Social Science,* November, 1929.)

THE CHRONIC "CRIME WAVE"

A few years ago, newspaper headlines assured us that we were in the grip of a "crime wave." This alleged crime wave has, however, been correctly diagnosed as a "state of mind," rather than an actual condition. (Dr. G. W. Kirschwey of the New York School of Social Work, in *The Survey,* January, 1927.) Ever since Revolutionary days, such "crime waves" have recurred in every generation, perhaps in every decade. The recent "wave" was chiefly based upon sensational news reports, and probably in part upon a real increase in the number and the spectacular character of robberies. But now there is a growing realization of the fact that our crime conditions are chronic, and may even have been worse a generation ago than at present. Certainly, in so far as comparisons can be made, there is ample evidence that crime is far more prevalent in the United States than in other leading countries.

HOMICIDE

Number of Homicides.—There were approximately 10,500 homicides during the year 1928 in the United States. This estimate represents homicides which were officially registered, and is based upon the fact that there were 10,050 homicides in the death registration area, which covered 95.4 per cent of the country's total population in 1928. These figures include both criminal homicides and so-called "justifiable" homicides.

Homicide Rates.—The homicide death rate in the registration area in 1928 was 88 per million inhabitants. Homicide rates in the United States are generally much higher than the rates in other countries. For example, in 1927 the homicide death rate in the United States was 87 per million inhabitants compared with rates of 5 per million for England and Wales and 14 per million for Canada (for charges of homicide).

Homicide Trends.—The table, page 489, shows the trend from 1910 to 1928 in the homicide rate, for the 21 states which belonged to the death registration area in 1910. There was a general upward trend in the homicide rate from 1910 to 1917. The rate was comparatively low for the next three years, rose sharply in 1921 and again in 1924, but has decreased slightly since 1924.

HOMICIDES PER MILLION INHABITANTS

(1910 to 1928 *)

Year	Rate	Year	Rate	Year	Rate	Year	Rate
1910	46	1915	51	1920	49	1925	56
1911	49	1916	54	1921	58	1926	55
1912	49	1917	60	1922	54	1927	55
1913	53	1918	51	1923	55	1928	54
1914	55	1919	52	1924	57		

* Figures are homicide death rates for the 21 registration states of 1910, as given in annual mortality statistics reports of the United States Bureau of the Census.

Homicide Causes.—Firearms still remain the chief agency of death, accounting for 68.2 per cent of the homicides in 1928, as compared with 66.6 per cent in 1927 and 69.2 per cent in 1926. Our large Negro population contributes considerably to high homicide death rates. In 1927, for example, there were 438 homicides deaths per million for the colored population as against 53 per million for the white population. The differences between the homicide death rates for the whole registration area and the rates shown in the table are largely explained by the fact that a number of states which have been added to the registration area since 1910 have exceptionally high homicide rates, chiefly because of their large colored population.

PRISONERS

Increase in Commitments. — In 1929 was published the first annual census report on prisoners in state and Federal prisons and reformatories in 1926. The corresponding report for 1927 is in preparation. In 1910, there were 32.3 prisoners newly received from the courts, per 100,000 inhabitants; in 1923, there were 34.6; and in 1927, 44.1. Over 50,000 prisoners are received annually. The ratio of prison commitments to population increased decidedly between 1923 and 1926 for nearly all offense classes, especially for offenders convicted of larceny, robbery, and burglary.

Prison Population.—From 1910 to 1928 the prison population increased 65.8 per cent. The ratio of prisoners for each 100,000 inhabitants increased from 74 on January 1, 1923 to 89.4 on January 1, 1928. The prison population of the United States now numbers well over 100,000.

Overcrowding of Prisons.—In the prisons for which information was available, the average population during the year 1927 was 19.1 per cent in excess of the normal capacity of the prisons. Since this figure represents an average for the country as a whole, in many states the overcrowding is much worse.

Prison Sentences. — The average length of the sentences of the male prisoners received under definite sentence in 1926 was 4.6 years; while those committed under indeterminate entence had an average maximum sentence of 10.3 years and an average minimum sentence of 2.4 years. There was little change between 1923 and 1926 in the prevailing length of prison sentences. The indeterminate sentence, which was used much more extensively in 1923 than in 1910, showed little increase between 1923 and 1926, but there is a tendency to make indeterminate sentences more flexible, by reducing the minimum and increasing the maximum length.

Recidivism.—Of the prisoners in 1926 for whom information is available, 44.4 per cent were reported as recidivists, while among these, the prisoners previously committed to prisons and reformatories formed 29.9 per cent.

Age.—Of the male prisoners received in 1926, more than one-half were under 27 years of age. Of the female prisoners received, nearly one-half were less than 24 years of age.

Time Served and Parole.—The male prisoners discharged during the year 1926 had been imprisoned on the average less than 2 years, while their maximum sentences had averaged more than 6 years. The male prisoners released on parole in 1926 served, on the average, 24.7 per cent of their average maximum sentences, while those released upon expiration of sentence served 66.1 per cent of their average length of sentence. Prisoners releasd on parole formed only 44.3 per cent of the total discharged in 1926, as compared with 53.9 per cent in 1923.

Earnings of Prisoners.—Another census report published in 1929, entitled "The Prisoner's Antecedents," presents exhaustive social and economic statistics concerning the 19,080 serious offenders who were committed to state and Federal penal institutions in the first six months of 1923. The average full time weekly earnings of the male prisoners prior to the crime were approximately $30. This was slightly above the average of $26 for factory wagearners, but much below the prevailing weekly wage rates of more than $42 for trade unionists in the larger cities.

Unemployment. — Of the male prisoners whose employment status was reported, 30.6 per cent were unemployed at the time of the crime, while 15.4 per cent had been unemployed for six months or more of the year prior to the crime. On the average, these offenders had been unemployed for about 25 per cent of the year prior to the crime, whereas industrial wage earners in general are estimated to be unemployed about 10 per cent of the time.

Education.—For every 100,000 illiterate inhabitants of the country, there were nearly 43 illiterate prisoners, as against 27 literate prisoners per 100,000 literate inhabitants. In proportion to population, there were about three times as many illiterate prisoners as there were prisoners who had attended college.

Family Status.—It was found that 29.6 per cent of these offenders had been separated from their parents before they were 16 years old, and that about 16 per cent had been separated under 14 years of age.

It was found that 38.3 per cent of the prisoners were not living with either family or relatives at the time of the crime. Of the married male prisoners, 23.8 per cent were reported as not living with their wives.

Residence.—The unstable life of these offenders is further shown by the facts that 27 per cent of them had been in the county where the crime was committed for less than one year, and that the same proportion (27 per cent) were non-residents of the localities where the crimes occurred. The prisoners living in urban districts numbered 23.1 per 100,000 of urban population, as compared with the ratio of 10.2 for the rural districts.

Locale of Crime.—For crimes committed in urban places, there were 25.1 prisoners per 100,000 of population, as against a ratio of 7.6 for the rural areas.

RESEARCH IN CRIMINOLOGY

Presidential Commission.—It is of interest to note some of the more important projects for the compilation of better criminal statistics, and for the study of crime and its treatment, which have been initiated, carried on, or completed during the past year. Perhaps the most important development in this direction was the appointment by President Hoover of the National Commission on Law Observance and Enforcement. This Commission, headed by George W. Wickersham, comprises nine other prominent members of the legal profession, and one woman, Dean Ada L. Comstock of Radcliffe College. An outstanding member of the Commission is Dean Roscoe Pound of the Harvard Law School, who has long been active in the movement to introduce scientific methods into the study of legal problems. This Commission is assisted by a staff of experts, who have been assigned to study various special phases of the general problem of law enforcement.

Police Statistics Plan.—The Committee on Uniform Crime Records, of the International Association of Chiefs of Police, has issued its report, outlining a detailed plan for the recording and compiling of statistical data by police departments, and the assembling of such data on a state-wide and nation-wide basis.

State Crime Surveys.—The Illinois Crime Survey report has been published, as well as the second annual report of the New York State Crime Commission. The New York State Department of Correction is compiling (November 1929) its first report containing court statistics and police statistics as well as penal statistics.

University Projects.—The Harvard University Law School is continuing its very intensive Boston Crime Survey, and has recently established an Institute of Criminal Law. The new Johns Hopkins University Institute of Law plans to study important problems of criminal as well as civil law, and especially to analyze the relationship of law with the other social sciences. Yale University has founded an Institute of Human Relations, which is conducting studies of social conditions and behavior, with incidental research concerning crime and delinquency. Columbia University is considering the advisability of establishing an Institute of Criminology, and is now conducting research on the work of the courts.

PRISONS AND PENAL CONDITIONS

By Austin H. MacCormick

Assistant Superintendent of Federal Prisons, Department of Justice

CONDITIONS AND PROBLEMS

There have been few significant changes in penal conditions in the United States during 1929. The outstanding problems of penal institutions are still the overcrowding and unemployment from which they have suffered increasingly in recent years. The large numbers of inmates which must be cared for necessitate mass treatment; there has been little progress toward the scientific individualized treatment which is the necessary basis of any program of rehabilitation. The development of new industries to provide employment for increased numbers of inmates has been slow, and organization of educational programs, academic or vocational, has been correspondingly slow. Expansion in the penal field has consisted largely of adding to the facilities of existing institutions. Only a few states, among which New Jersey is notable, have developed a group of penal institutions representing a diversity of types and designed to care for differing groups of prisoners. It may be said that our penal institutions, taken as a whole, are more nearly at the breaking point as 1929 ends than at any time in the past. Prisons have long since passed the size beyond which they can safely grow if they are to perform any function save that of segregating offenders from society.

PRISON RIOTS

The year has seen an unprecedented number of serious riots: at Clinton (N. Y.) on July 22; at Auburn (N. Y.) on July 28; at the Federal Penitentiary at Leavenworth on August 1, and at the Colorado Penitentiary on October 3. The first three resulted in the death of six prisoners; the Colorado riot took a toll of thirteen lives. Both the Auburn and the Colorado riots were attended with heavy property loss, the shops of the former being virtually destroyed.

Investigations show that among the basic causes of each of these riots is overcrowding, with all its attendant evils. The effect on public opinion and on governmental authorities has been to expedite plans for far-reaching programs of expansion and improvement. The Federal Government and the Governor of New York have already announced forward-looking plans to be carried out without delay. These involve not only an increase in the number of institutions but also a reduction in the size of each and a diversification of types. The riots, tragic as they were, seem likely to have their compensating benefits in the speeding of necessary legislation to meet the needs of institutions throughout the country.

NEW PRISON CONSTRUCTION

A number of important building projects have been completed or undertaken during the year. Folsom (Cal.), which is badly overcrowded, has a new cell house and a new hospital under construction. Connecticut has started an extension of the wall to enclose projected shops. Delaware has completed a vocational shop and a new section for women, the latter outside the main institution. Idaho has completed a cell house, and a dormitory building for trusties outside the walls. Indiana is building a cell house. Kansas has completed a laundry and tailor shop and a new cell block. Maryland has made improvements costing $1,000,000 at the House of Correction, a new administration building, cell house, shop, etc. and a reconstruction of the women's section. The legislature has appropriated an initial amount of $730,000 for a new penitentiary which is not to be in Baltimore.

Rapid progress is being made on the buildings of the new Massachusetts Prison Colony at Norfolk. At Jackson (Mich.) eight of the fifteen cell blocks at the new prison have been completed and two are under construction. Other major buildings, such as the dining halls, administration building, hospital and some of the shops, are also completed. At Marquette (Mich.) farm buildings and an exercise yard for the segregated group have been completed. At Stillwater (Minn.) a cell house was finished in December, 1928, and a warehouse is under construction. Modern buildings have been erected on the New Jersey prison farms. New Mexico has built a new hospital. The new buildings at Sing Sing (N. Y.) have been occupied, although the old cell house is still in use for the more hardened offenders. The New York legislature has made an initial appropriation of $3,000,000 for the proposed prison at Attica, and plans are being made for large expenditures to rebuild Auburn and to improve Clinton. Napanoch (N. Y.) is building a housing unit and a staff house.

Oklahoma has a new industrial building. Oregon has completed an administration building and an industrial building. The new Eastern State Penitentiary (Pa.) has completed the wall and 75% of the first of the eight proposed cell houses. The Tennessee Penitentiary has a new building for women. In Texas a legislative commission has been making a survey preparatory to reporting plans for a central prison to a special legislative session. The prison is designed to replace the present system of prison farms. Utah has a building commission which is to select a site for a new prison and make recommendations to the next legislature. Vermont has a new cell block, a wing containing a hospital, library, etc., and several new farm buildings. The Virginia penitentiary has completed a new building containing a kitchen and dining room, schoolrooms, chapel, hospital and some factory space. Wisconsin has built a modern cell block into an old cell house. New construction in progress or completed at the Federal Penitentiaries at Atlanta and McNeill Island include a new industrial shop and a hospital annex at the former and an administration building, a hospital annex, and an auditorium building at the latter.

PRISON HOUSING AND WORK

Overcrowding.—In spite of the additions to living quarters which have been made, practically all the larger prisons and many of the smaller ones are seriously overcrowded. The practice of putting two men in single cells and of housing the overflow in makeshift dormitories is general. The Federal Penitentiaries at Atlanta and Leavenworth are nearly 100% overcrowded. Such important prisons as those of New York, Ohio, Michigan, Illinois, Pennsylvania, Missouri, Wisconsin, California and Virginia, for example, are overcrowded in varying degrees. In most cases this condition must be met by the establishment of new institutions rather than an expansion of the old. Overcrowding is more than a matter of living space;

it affects the preparation and serving of food, employment, guarding, medical service, education and all other activities of the institution.

Unemployment.—Few prisons in the country have enough work for all their inmates. It is customary to overman both industries and maintenance details by assigning several men to every one-man job. Several prisons, which now have work enough for all their inmates, must effect a complete reorganization of their industries before the Hawes-Cooper Bill becomes operative in 1934.

Expansion in Prison Labor.—There has been little industrial expansion, however, during the year. Connecticut is working on a diversification of its industries. Florida is supplementing its contract shops by an expansion of its extensive farm operations. Georgia has established an auto license shop at Milledgeville. Idaho has acquired a 550-acre farm. Louisiana, where the principal industry is growing sugar cane, has established a tile plant and shops for making auto license plates and highway markers. Massachusetts has started a concrete industry and is making highway markers in addition to license plates. Michigan is operating a textile shop and a dye plant at the new Jackson prison. New Jersey is steadily expanding farm work and road building. South Dakota is making license plates and is working all men on four-hour shifts. Wisconsin is making novelty whisk-brooms. Tennessee has opened a new coal mine at Brushy Mountain. Several states have expanded their farm and road-building operations. Others have suffered from temporary curtailment of their industries. The industrial status of most of our prisons, however, has shown no appreciable change during the year, except such change for the worse as is involved in increased numbers of inmates without corresponding increase of means of employment.

REFORMATORIES FOR MEN

There have been no important changes at Cheshire (Conn.), which is not overcrowded and has sufficient work for the inmates at present. The Illinois Reformatory has had as high as 1970 inmates with facilities for 1200 and has had an increase of 827 in the last five years. Unemployment prevails; a military instructor and an athletic instructor have been added to the staff to develop activities to occupy the time of some of the inmates. The educational work has been expanded. A new cell block and a new factory building are being built. Indiana has 1800 inmates with facilities for 1200. A new cell house has been built. More farm land has been acquired but the employment problem is serious.

The Kansas Reformatory is not overcrowded and is able to supply employment for the inmates. Over 4000 acres of farm and orchard land are being operated. A new industrial building is under construction. The State system of school grading has been adopted. Kentucky has over 2000 inmates with facilities for 1500. The inmates are employed. A new industry, the making of nightwear, has been established and 300 men are employed in it. Massachusetts is not suffering from overcrowding or unemployment. The educational work, especially along vocational lines, has been greatly improved during the year. Michigan is changing its dormitories to cells and has a 400-cell building under construction. The reformatory is overcrowded during the winter months. There is no educational work except a small trade school, the main school building being used for living quarters. New Jersey is about to start a new wing at Rahway and work on the new reformatory at Annandale is progressing rapidly. The inmates are fully employed in the shops and schools and on construction and road-work. Men are being regularly transferred from the State Prison to Rahway and from Rahway to Annandale.

The Ohio Reformatory is 30-40% overcrowded and the population is steadily rising. There is not enough work for the inmates in spite of the extensive shops, schools and farm work, A new dormitory for 250 trusties outside the walls has been built and two new wings on the furniture factory are being built. Oklahoma has added 200 cells and has made other extensions to the plant. Pennsylvania has completed a furniture factory, and a new hospital is under construction. The institution is overcrowded but the inmates are employed in excellent shops and trade schools. Washington has occupied its new cell house during the year and has expanded its educational program under trained direction. Wisconsin has abolished its quarry and stone shop. Over 2700 acres of farm land have been operated, for the most part on the honor system with half the men outside the wall, and no men have been lost during the year. The silent system has been abolished in the shops. The institution is full to capacity.

In general, the reformatories for men in over half the states continue to differ from the prisons largely in their emphasis on education, both academic and vocational, rather than on productive industries, although most of the reformatories have industries as well as schools. In the use of cells, in their methods of discipline, and in many other respects they closely resemble the prisons and are in effect "junior prisons." The pressure on prisons and the increase in crimes committed by young men have increased the reformatory population greatly in recent years, and they now receive many inmates of a type for which they were not originally designed. Mass treatment and stereotyped programs of education have lowered their effectiveness. A few, among whom Pennsylvania is notable, have succeeded in developing significant programs of vocational education in spite of their handicaps.

REFORMATORIES FOR WOMEN

Connecticut has a number of buildings under construction, among them a building for the prison group and an industrial building containing an auditorium. Iowa is filled to more than capacity and no new buildings have been built or authorized during the year. Kansas has a new three-story cottage. Maine has received authorization for a cottage for mothers and babies. Massachusetts has added to its farm buildings. During the year older and less reformable types have been received and the institution is no longer permitted to transfer feeble-minded and defective inmates. Nebraska has moved a farm house into line with the cottages and has renovated it. New Jersey has a new cottage and additional facilities for classification. Another cottage and an administration building containing an auditorium and school space are under construction. The institution is now doing all the laundry for the new men's reformatory at Annandale. Ohio has an appropriation for new buildings but work has not been started. The institution is badly overcrowded, with 500 inmates and facilities for only 300. A change in the law during the year provides that misdemeanants shall no longer be committed to the reformatory. Pennsylvania has two new buildings authorized and a building for tubercular inmates is being constructed. The school work has been greatly expanded during the year.

LOCAL INSTITUTIONS

In Pennsylvania, Berks County and Delaware County have taken a significant step in beginning the construction of farm institutions to take the place of the county penitentiaries. The Federal Government has established a Detention Headquarters or local jail in New York City, but is still boarding about 9000 short-term prisoners in 1100 county and state institutions. $1,680,000 has been appropriated by New York City for a House of Detention for Women and an initial appropriation of $3,325,000 has been made for a new county penitentiary on Riker's Island to replace the antiquated institution on Welfare Island.

FEDERAL PRISON PROGRAM

Following the appointment of Sanford Bates as Superintendent of Federal Prisons, the Department of Justice announced an extensive and progressive program which has been endorsed by President Hoover and will be placed before Congress during the present session. Among the items in the program are expansion of the Federal probation system, reconstruction of the parole system, increase in the number and diversity of Federal institutions, reduction of overcrowding and unemployment in existing institutions, development of industries, expansion of educational work and health service, improvement of conditions in local institutions where Federal prisoners are boarded, improved training of officers, and use of all effective methods for the rehabilitation of inmates.

In September the War Department turned over to the Department of Justice the Army Prison at Fort Leavenworth, Kan., and this was put in operation as an annex of the Penitentiary at Leavenworth, prisoners being transferred there from Atlanta as well. It will be used primarily for drug addicts in advance of the opening of the two narcotic farms authorized by Congress.

The new Federal Reformatory for Women at Alderson, W. Va., is now in full operation and construction of the Reformatory for Men at Chillicothe, Ohio, where 1400 men are quartered in cantonment barracks, has begun.

PERSONNEL

Among the appointments made during the year are the following: Sanford Bates as Superintendent of Federal Prisons, Dr. A. W. Stearns as Commissioner of Correction in Massachusetts, Dr. Walter N. Thayer as Commissioner of Correction in Maryland, Col. F. D. Whipp as Superintendent of Prisons in Illinois, Arthur C. Aderhold as Warden of Atlanta, Jesse O. Stutsman as Superintendent of the Federal Detention Headquarters in New York City, Major Henry C. Hill as Warden of Joliet, James A. White as Warden of the Southern Illinois Penitentiary, James L. Hogsett as Warden of the Massachusetts Prison, M. F. Amrine as Warden of the Kansas Prison, Arthur J. Ericsson as Superintendent of the Kansas Reformatory for Men, Maj. Mark O. Kimberling as Superintendent of the New Jersey Reformatory at Rahway, Capt. George Giger as Superintendent of the New Jersey Reformatory at Annandale, James A. St. Peter as Superintendent of the Washington Reformatory, and Miss Edna Mahan as Superintendent of the New Jersey Reformatory for Women at Clinton. During the year Warden Scott of the Connecticut Prison, Warden Hendry of the Massachusetts Prison, and Warden Chilton of Kentucky have died.

PUBLICATIONS

Among the important publications of the year are the third *Handbook of American Prisons*, published by the National Society for Penal Information, and the following Government documents: *The Prisoner's Antecedents* and *Prisoners in State and Federal Prisons and Reformatories*, both Census Bureau publications, and *Prison Industries*, published by the Bureau of Foreign and Domestic Commerce, Kuhlman's extensive bibliography, *Guide to Material on Crime and Criminal Justice*, (H. W. Wilson Co.), contains valuable material on penal conditions.

PREVENTIVE WORK IN DELINQUENCY

By Douglas P. Falconer

Executive Secretary, Children's Aid Society, Buffalo

CRIME DETECTION AND PREVENTION SURVEY

The most significant development of the year in preventive work in delinquency is a survey of crime detection and prevention in the United States to be undertaken under the auspices of the Columbia University Law School. Dr. George W. Kirchwey, formerly dean of the Columbia Law School and warden of Sing Sing Prison, at present lecturer on crime and criminology of the New York School of Social Work and chairman of the section on deliquents and correction of the National Conference of Social Work, will act as general adviser. The investigation of juvenile delinquency will be under the direction of Dr. W. I. Thomas, author of *The Unadjusted Girl* and *The Child in America;* and probation and parole and prison administration will be reported by Professor E. H. Sutherland of the University of Minnesota.

CHILD GUIDANCE CLINICS

The year has seen further development of the mental hygiene and child guidance programs, of which the following are illustrations: 1. Niagara Falls, N. Y., has a new $4,000,000 foundation created by Martha Beman, to establish a child guidance clinic, and a study of the community by the Child Welfare League of America resulted in the organization of a Children's Aid Society, the appointment of two visiting teachers and a juvenile court probation officer, prior to the opening of the clinic, and essential to its proper functioning; 2. New York State Crime Commission's sub-committee on Causes and Effects of Crime. recommends mental clinics in connection with the school; 3. Massachusetts Advisory Council on Crime Prevention recommends more mental clinics, visiting teachers and boys' clubs, and 4. the California Commission for the Study of Problem Children, in its report to the 1929 Legislature, recommended the appointment of a committee to make a state wide mental hygiene survey. In fact child guidance clinics are growing rapidly in popularity in nearly all parts of the country, a list of psychiatric clinics for children published by the Federal Children's Bureau this year names 515 full and part time clinics.

THE WHITE HOUSE CONFERENCE

Projected Plans.—The inter-relationship between delinquency and dependency on the one hand, and physical and mental ill health and educational maladjustment on the other, has long been recognized, and one of the outstanding events of the year is the appointment of a committee by President Hoover to arrange for the third White House Conference on Child Health and Protection. The first was called by President Roosevelt in 1910, and the second by President Wilson in 1919. The projected conference will be held in the fall of 1930, or later, if adequate preparation cannot be made by that time.

Committees.—Under the chairmanship of the Secretary of the Interior, Dr. Ray Lyman Wilbur, with Dr. H. E. Barnard, as director and Miss Grace Abbott, Chief of the Federal Children's Bureau as secretary, four general committees have been formed: 1. Growth and Development; 2. Medical Service and Public Health Administration; 3. Education and Training, and 4. The Handicapped: Prevention; Maintenance; Protection. These committees are to attempt to make an authoritative statement as to (1) our present situation, (2) desirable and practical goals to be achieved, (3) methods of accomplishing desired results.

Program.—Available data is to be correlated, and when necessary and possible, additional studies are to be made. About 500 of the best informed people of the country have been enlisted in the undertaking, and the whole cause of childhood, including the prevention of delinquency, should be measurably advanced. The first meetings of the committees have already been held, and the focus of attention seems to be centered on the possibilities of prevention.

PUBLIC PROBLEMS

Industrial Difficulties.—The year has seen important developments in the industrialization of the South, with resultant disturbances in the economic and social life of the people. The bitterness of industrial strife is entering this section of the country and unless much more intelligent guidance is shown in the future, anti-social attitudes and behavior will inevitably increase. The lawlessness and brutality of the Gastonia strike sufficiently illustrate the point. In spite of a widespread demand for reform, perhaps the most unaminous one ever arising in Pennsylvania, no substantial change was made by the legislature in curbing the Coal and Iron Police organization. Such failures of the legislature to respond to popular will tend to embitter the population, and more and more people lose confidence in our fundamental organization of government. This attitude is a contributing factor to lawlessness.

Prohibition.—The President's Commission which is studying the problems arising from the attempts to enforce the prohibition laws, has announced no conclusions as yet. Delinquency is unquestionably increased in many areas by the open defiance of and contempt for prohibition, and the report of the Commission is hopefully awaited.

PRISON RIOTS

The year has seen a series of prison riots, which have served to focus public attention anew on the criminal and his crimes. Many hoped that this might result in a serious and far reaching reconsideration of our entire handling of convicted persons—indeed of our approach to the problem of crime. These riots have been cited by many authorities, such as Dr. George W. Kirchwey, as symptomatic of a festering and socially dangerous condition existing in our prisons. Eloquently, and it would at first appear, convincingly, the inadequacy and utter failure of our whole process of detection, arrest, trial and imprisonment of criminals has been demonstrated. Pitifully small are the results however, and it must be frankly recognized that our present police, judicial and prison systems have an exceedingly firm grip on our thinking, and that leaders able to improve our situation and the public understanding to enable the leaders to work effectively, are still lacking.

NEW POLICE ACTIVITIES

The use of police officers in constructive social activities has developed in several communities, illustrated by: 1. The New York City Police Department Crime Prevention Bureau, with a budget of $99,000, which will have social investigators who will coöperate with social agencies to prevent juvenile delinquency; 2. All members of the New York Police Department supplied with a seven page directory of the social agencies of the community, for use in referring situations needing immediate attention; 3. To prevent juvenile delinquency and to promote more friendly relations between the police and the youth of the community, the Far Rockaway, New York, police conducting a series of entertainments for the Boy Scouts; 4. The Chicago police making efforts to secure employment for boys, resulting in a 24 per cent decrease of arrests for delinquency.

REFORM OF AMERICAN JUSTICE

Among bar associations, laymen and political leaders there are increased signs of a genuine movement to bring some order and simplification to our judicial and legal processes, in both civil and criminal matters. While the chaos here existing cannot be classified as a primary cause, the law's delays and inequalities to rich and poor are increasingly a public scandal, and the already widespread mistrust of our courts is increasing. There is not yet sufficient momentum behind the protests to achieve substantial results, but Governor Roosevelt of New York stressed an important point in his recent address to the alumni of the Columbia Law School when he predicted that the reforms, so urgently needed, will come through the insistance and participation of intelligent laymen. Lawyers are trained to the present processes, and profit by them. Laymen have little use for the intricacies of the law, and will insist on cutting through the red tape which is such an encumbrance to-day. Only by radical reforms can the courts become that deterrent and corrective force for which they are intended.

STUDY AND RESEARCH

Harvard University Law School has established an Institute of Criminal Law for study and research in the field of criminology and penology under Professor Francis B. Sayre. Dr. Sheldon Gluech, author of *Mental Disorders and the Criminal Law* will be on the staff.

Johns Hopkins University has created an Institute of Law to attempt "an integration of the social sciences in a study of the law in its broadest sense."

Yale University has received $7,500,000 to found an "Institute of Human Relations." It will begin its work in the fall of 1930, with the object of making a study of human behavior, by pooling the resources of all its departments of natural and social sciences in the hope of achieving a coördination of knowledge and technique such as has never before been attempted in solving problems of human relations.

Illinois Crime Survey.—Dean John H. Wigmore of the Law Department of Northwestern University, who for two years has been chairman of a committee studying crime in Illinois, says: "The constitution's law is inefficient; the legislature's law is inefficient; the supreme court's law is inefficient, the trial court's methods are inefficient; the prosecuting department is inefficient; the police system is inefficient; the jury system, the probation, parole and prison systems are inefficient."

SOCIALISM

By Algernon Lee

President, Rand School of Social Science, New York

UNITED STATES

New York Mayoralty Election.—Notwithstanding the smallness of the vote at the Presidential election of 1928 (only 267,000 in all), the Socialist Party has during 1929 shown more activity and a more hopeful spirit than at any time since 1924. This was greatly stimulated by the results of the New York City election Nov. 5. Norman Thomas, Socialist candidate for Mayor, polled 176,000 votes, or more than one-eighth of the total, and even the 90,000 votes cast for his two colleagues on the city ticket represented an increase of more than 100 per cent over the Party's mayoralty vote at the best preceding municipal election.

Socialist Victory at Reading.—Simultaneously, in Reading, Pa., the Socialists made a practically clean sweep, completing the victory they had won in 1927. Gains were made in a number of smaller places throughout the country.

Party Membership and Funds.—For several months before the election the dues-paying membership of the party organization had been growing and a successful nation-wide drive was made for funds to clear off its debts and provide for increased activity. The influx of new members became still more rapid after the election. The executive secretary of the party organization,—William H. Henry—having resigned, Clarence Senior of Cleveland was chosen to succeed him.

GREAT BRITAIN

The Labor Ministry.—The outstanding event of the year 1929 in the field of Socialism was the victory won by the Labor Party at the general election held May 30, and the consequent formation of a Labor ministry. In the outgoing Parliament, after having gained about a dozen seats at by-elections during a little more than four years, the Labor Party had 162 members; the Conservatives, 401; the Liberals only 46, and there were six independents. The newly elected house contained 289 Laborites, 260 Conservatives, 58 Liberals and eight independents. Labor has since captured another Conservative seat in a by-election. The popular vote was divided as follows: Conservative, 8,664,000; Labor, 8,363,000; Liberal, 5,301,000; Communist, 51,000.

Party Support in Parliament.—It was obvious that only the Labor Party could take the responsibility of government, but it was equally obvious that Labor can hold ministerial power only so long as the Liberals refrain from joining with the Tories to vote lack of confidence and thereby bring on a dissolution and new general elections. The generally expressed opinion is that this will probably not take place earlier than 1931, as the appearance of not giving the Labor ministry a fair chance to make good would turn public feeling strongly against the Liberal Party. Unforeseen events may, of course, upset this calculation. In December, the Liberals did vote in opposition on one occasion, but it was at a moment when enough Conservatives were absent to leave the Government a majority of eight votes.

Personnel of the Cabinet.—In June, J. Ramsay MacDonald became Prime Minister for the second time, with Arthur Henderson as Secretary for Foreign Affairs. Philip Snowden as Chancellor of the Exchequer, J. R. Clynes in the Home Office, Margaret Bondfield as Minister of Labor, Sidney Webb (since raised to the peerage as Baron Passfield) in the Colonial Office, and J. H. Thomas as Lord Privy Seal with the special task of dealing with the problem of unemployment. All of these, and most of the other ministers, are former wage workers or at any rate born of working class parents.

Policies and Program.—The British Labor Party has for years been affiliated with the Labor and Socialist International (sometimes called the Second International), of whose executive board Mr. Henderson was chairman at the time of the election. In the campaign manifesto, published as a pamphlet under the title of *Labor and the Nation*, the Party had frankly and emphatically declared its Socialist principles and purposes. Recognizing that until it has a clear majority in the House of Commons, backed by at least the numerically strongest party at the polls, if not by an absolute majority, it cannot expect to carry out its whole program, the new Government at once made it clear that it would not enter into a coalition in order to retain office, but would go ahead on its own lines as rapidly as circumstances would permit, trusting that whenever it is voted out of power the ensuing elections will give it increased strength. Its two most urgent tasks it considered to be those of promoting world peace and of diminishing or relieving unemployment at home. The former has a bearing on the latter, since reduction of military and naval expenditures would release funds for industrial development and social services.

Labor and Foreign Affairs.—During the Labor Party's first half year in office much was accomplished in the field of foreign affairs. Diplomatic relations with Soviet Russia were promptly resumed. Egypt was given a much larger measure of actual independence than either Tory or Liberal Governments had ever been willing to concede. It was made clear that, if the Labor Government has its way, India may expect dominion status within the Empire comparable to that of Australia or Canada. At the Hague Conference on Debts and Reparations, Mr. Snowden's firm stand, while it caused momentary irritation, increased British prestige abroad and the popularity of his Government at home, by breaking the tradition of excessive complaisance toward France which was a hang-over from the pre-war policy of the ententes and alliances. At Geneva, Mr. MacDonald and Mr. Henderson demonstrated the desire of the Labor Government to aid in making the League of Nations a more effective instrument than it has hitherto been for dealing constructively with the problem of permanent peace among nations and for international coöperation along lines of social progress. Mr. MacDonald's bold step in coming to the United States for the purpose of talking face to face with President Hoover concerning plans for reduction of armaments, appears to have had a strong effect upon public opinion the world over.

Labor and Domestic Affairs.—As the year closed, the Government was carrying through Parliament a bill to reduce the miners' work day from eight hours to seven and a half and to initiate reorganization of the "sick" coal mining industry, and a bill to amend the unemployment insurance laws so as to give more prompt and more nearly adequate relief to those who are unable to find work. A number of minor reforms have been effected by administrative action, and some steps have been taken toward extension of public ownership in the transportation industry. The work of the Labor Government will not, however, get fully under way until the adoption of the 1930 budget, in preparation for which exhaustive studies are being made.

British Municipalities.—The effect of the Labor victory at the parliamentary elections in May was reënforced when in November local elections were held in some 400 boroughs outside of London. These resulted in a net gain of 117 seats for the Labor Party. About three-fifths of the victories were won at the expense of the Conservatives. As yet Labor is relatively weaker on the municipal than on the parliamentary field, holding little more than one-tenth of the aggregate number of seats in the borough councils and having a majority in only about one-twentieth of these bodies. Its progress, however, if not very rapid, is remarkably steady. For at least ten years Labor has annually added from 100 to 150 to the number of its borough councilors.

AUSTRALIA

Socialist Victory in General Election.—As a result of the general election held Oct. 12 the Labor Party, which is an avowedly Socialist body, has taken the reins of government for the fifth time in the twenty-nine years' history of the Australian Commonwealth. Between 1901 and 1917 Labor won power four times, but never with a large enough majority to make its position very secure. For the last twelve years the Government was in the hands of a coalition of the Nationalist and Country parties. In the Parliament elected in 1928 this coalition had 42 seats, as against 31 for Labor and 100 independents. The erratic policy of Premier Bruce, who first tried to obtain an inordinate increase of Federal powers in the matter of compulsory arbitration of labor disputes and related subjects, and failing in this, suddenly proposed the complete abandonment of Federal arbitration, led to the breaking of the coalition.

The New Premier.—The October election gave the Labor Party 43 seats, with 17 for the Nationalists, 11 for the Country Party, and four independents, at least one of whom can be counted upon to vote with the Laborites. The new Premier is James H. Scullin, of Victoria, who was a Labor member of the House from 1910 to 1913 and again from 1922 on, and who was elected leader of his party early in 1928.

Victoria State Election.—At the time of the general election Labor was in power in two of the six states, —West Australia and Tasmania— while in the legislatures of Victoria and New South Wales they had more members than any other party, but were outvoted by a Nationalist-Country Party coalition. But Dec. 2 Victoria had a state election which gave Labor 30 out of the 65 seats, with only 18 for the Nationalists and 9 for the Country Party, 5 for the Country Progressives, and three independents. Nine days later the new assembly met, the coalition ministry was defeated by a vote of 36 to 28, and Edmond Hogan, Labor Party leader and once before Premier, was called to head the new ministry.

Nationalist Majority in Upper House.—The upper house of the Federal Parliament, which consists of six members from each of the six states, elected for a fixed term of six years, has still a Nationalist majority. It will for a time be able to exercise a check upon the policies of the Scullin government.

AUSTRIA

The political situation in Austria continues to be unstable and more or less threatening, but toward the close of 1929 had become somewhat less strained than for a long time before. The administration of Vienna, the one large city of the republic has, ever since the reorganization following the war, been completely in the hands of the Social Democrats, who constitute an overwhelming majority of the population. They have successfully carried out an extraordinary program of Socialistic activity, among whose principal features are municipal construction of dwellings on a very large scale, with the wiping out of the old slum districts, and a great extension and improvement of the school system and of the public health services. This has, of course, involved heavy taxation upon the rich. In the Federal Parliament, on the other hand, the Socialists are a minority, though strong enough to defeat proposed amendments to the Federal constitution by which the reactionary parties have wished to curb the Vienna administration. The Socialists have, indeed, made some gains in the rural districts at parliamentary and other elections; but most of the country outside Vienna still remains in the hands of the clerical and conservative forces.

In the summer of 1929 the Heimwehr or armed organization of the clerical-nationalist elements, openly threatened that unless the Socialists made a complete surrender they would march on Vienna and impose their will by force, as the Italian Fascists had done by their march on Rome a few years before. The Socialists signified their willingness to make some concessions to avoid a political deadlock which would altogether paralyze the Government, but refused to bow to the threat of civil war. When the time came, the Heimwehr marches proved much less formidable than had been expected. Early in December, as an outcome of prolonged negotiations between Chancellor Schober and the Socialist leaders, a series of constitutional amendments were adopted. The President of the republic is henceforth to be elected by popular vote and to have somewhat increased powers; and both the police and the financial administration of Vienna are brought more fully under federal supervision or control.

CZECHO-SLOVAKIA

The most important election on the Continent during 1929 was that held in Czecho-Slovakia in October, which gave results very favorable to the Socialist movement. There are in this country two Socialist parties, one of which represents the numerous German-speaking element of the population. The Czechist Socialist party doubled its popular support, casting a total of 930,000 votes and electing 39 members of parliament. The German Socialist party of Czecho-Slovakia increased its popular vote from about 400,000 to 507,000 and elected 21 members. These two parties, between whom in former times, some friction existed, have now for a number of years been working together in complete harmony. In the last Parliament they had together 48 members; they now have 60 out of a total of 300. The so-called National Socialist Party, led by Edward Benes, the Premier, increased its vote from 609,000 to 675,000 and won 32 seats; this is, however, an advanced radical party, rather than Socialist in the full sense of the word.

FRANCE

The Socialist party gained one seat in the lower house of the French parliament at a by-election in April, 1929. The partial elections for the Senate, later in the year, also gave the Socialists a gain of one. The Socialist delegation in July voted unanimously for immediate withdrawal of troops from the Rhineland. When the Briand Government fell, there was an attempt to pursuade the Socialist Party to join with the Socialistic Radicals in forming a coalition ministry; but by a rather narrow vote in a special party convention the proposal was rejected.

POLAND

In Poland as in Austria there seemed to be grave danger of civil war in 1929, but the year closed with a more peaceful prospect. While the 1928 election had increased the Socialist delegation in Parliament from 42 to 63, they still remained but one among several parties, none of which came near having a majority.

ORGANIZED SOCIAL WORK

BY HOWARD R. KNIGHT

GENERAL SECRETARY, NATIONAL CONFERENCE OF SOCIAL WORK

NATIONAL CONFERENCE OF SOCIAL WORK

Annual Meeting.—The largest single event each year in the field of organized social work is the annual meeting of the National Conference of Social Work. The 1929 meeting was held in San Francisco, being the first time in nearly fifteen years that it has met on the Pacific Coast and the first time since 1889 that it has met in San Francisco. More than four thousand delegates, representing every state in the union and several foreign countries were present. The next conference will meet in Boston in 1930 under the presidency of Miriam Van Waters, referee of the Juvenile Court of Los Angeles.

Program.—It is extremely difficult to draw out of the complex program and the discussion of a wide variety of topics that are the keynotes of such a Conference. However, the program of the Conference does reflect social thinking during the current year. The President, Porter R. Lee, Director of the New York School of Social Work, in his presidential address, clearly pointed out the fact that social work has become increasingly recognized as a definite function of community life. Historically, social work began as a series of causes with all the implications of cause but, while there is still room and need for the cause, the bulk of social work is now carried on along regularly organized lines as a recognized part of community life.

Discussion.—A large part of the program seemed to carry out some of the implications of this keynote. Considerable discussion was given to the methods of social work, the devices for measuring results, comparisons of costs and the amount of social work needed in various communities. Social technique, as usual, consumed a large proportion of the program. This was particularly desirable, in as much as the workers on the Pacific Coast were anxious to get the benefit of the methods worked out in other sections of the country, and also the eastern and middle-western groups were anxious to learn of the developments along the Pacific coast.

Studies and Reports.—The Conference was also characterized to an unusual extent by probing into some particular fields of social life. The Juvenile Court came in for considerable analysis of its purposes and its results. Reports were received on the economic cost of medical care, an analysis of the existing standard of living was examined in the light of the recent report of the National Economic Research Bureau. Problems of migration, particularly of Mexican migration, were given extended discussion, both by Americans and by Mexicans. A new note came into the Conference this year with the presentation of some of the results of the recent study of the American Indian. Sufficient interest was aroused so that for the next two years definite programs will be constructed to carry this discussion further. It would be possible to go on almost indefinitely, pointing out particular topics but the above appear to be the high-notes of the Conference.

AMERICAN ASSOCIATION OF SOCIAL WORKERS

Social Case Work.—This relatively new organization of professional social workers presented two significant developments during the year. One was the publication of the so-called Milford Report entitled, *Social Case Work—Generic and Specific*. This report is the result of several years' study on the part of a small group of social workers engaged in various forms of social case-work. It is a most valuable and up-to-date definition and explanation of case-work.

Membership Requirements.—A special Committee of the American Association of Social Workers reported at its annual meeting, held at San Francisco in June, a new draft of membership requirements of the Association. This Committee has been at work for three years examining the professional requirements of other professional organizations and made a report which was ultimately adopted, which in the end will raise the professional standard of admission to the organization, which in turn will undoubtedly raise the standards of education and training of professional social workers. The Association also reported the largest membership in its history.

COMMUNITY CHEST CAMPAIGNS

With but very few exceptions every city in the United States of one hundred thousand population and over now finances the major part of its social work through Community Chests, that is, such part of its social work program as is financed from private funds. Despite the slump in the stock market and the fact that many cities had begun to feel that they had reached the saturation point of giving, the Community Chest campaigns of 1929 were on the whole successful and produced increased funds. In a partial report submitted in the December 15 Survey, the returns from eighty campaigns to provide funds for 1930 work were submitted. Of the eighty campaigns, fifty-three produced more money than in the previous year, while nine others reported a slight reduction. The difference between what was raised for 1930 and what was raised for 1929 is so small as to be practically negligible. Chests in ten cities which reported less money raised than in the previous year also stated that the returns were incomplete with every prospect for equalling or increasing the amount over that of the previous year. In some cases this has already been accomplished. The net increased funds produced for the eighty campaigns as a whole was more than $500,000. Evidently the Community Fund method of financing that part of the social work program of the community which is supported by private funds has come to stay.

WHITE HOUSE CONFERENCE ON CHILD HEALTH AND PROTECTION

Purposes and Organization.—One of the most significant events of the year was the organization under the direction of President Hoover of a White House Conference on Child Health and Protection. The first White House Conference was held under the presidency of Theodore Roosevelt. Since then much new information has become available, and the time is ripe for a new study of the present situation and the laying out of a new program in the light of existing knowledge and information. President Hoover's Committee has, therefore, been organized to study the present condition of the health and well-being of the childhood of America to find out what the existing situation is and to make such recommendations as may be desirable on what needs to be done and methods for accomplishing it. It is not proposed to hold the Conference as such for another year or so. In the meantime, four sections have been organized to study various phases of the question. The first will have to do with Growth and Development of the Child; the second, Medical Service and Public Health Administration; the third, Education and Training; and the fourth, Handicapped Children, Prevention, Care and Protection.

Significance of Conference.—This study with the proposed White House Conference should be one of the most significant forward steps in organized social work as it will bring together in a scientific way existing knowledge and will produce unquestionably a carefully worked-out program for future development.

GENERAL SOCIAL PROBLEMS

Unemployment.—From time to time the emphasis in social work changes as new needs emerge or new knowledge becomes available. So far as one individual can judge, such emphases, during the past year, had to do with new problems of unemployment and its closely related question, the care of the dependent aged. Modern inventions in machinery and the speeding up of industry have had a tendency to increase unemployment and in some instances make it exceedingly difficult for men past forty-five or fifty years of age to secure satisfactory new employment. It is a period of change and transition which needs careful study and sympathetic treatment both on the part of social workers and industry.

Care of the aged is becoming an increasingly serious problem. Many of the existing agencies for the care of the aged are changing their scope and function and methods and there is increasing discussion of Old Age Pension Legislation. Another serious situation that is causing considerable thought and study on the part of social work is the increasing cost of relief of poverty. Not only has the cost of living gone up but our standard of life has gone up, too, and the American community apparently is not satisfied to give relief when needed on a basis of a standard of living of forty years ago.

Integration of Social Work.—Partially due to the Community Fund movement and also probably reflecting somewhat the thought of modern industry, there has been a very definite tendency toward integration of social work efforts. The past two decades have seen considerable specialization in the field. At the present time so far as one person can judge, the emphasis is now toward working out relationships, organic or otherwise, between existing organizations, frequently bringing them together under councils of social agencies that look at the needs of a community as a whole and developing the social work program of a community on the basis of the sum total of the needs of the community rather than upon the particular interests of specialized agencies.

Legislation.—Space will not permit any detailed review of social legislation during the past year other than to point out that there is apparently a reviving interest in attacking some of the more serious problems of community life through adequate legislative means.

HOUSING

By George Gove

Secretary, New York State Board of Housing

MULTIPLE DWELLINGS LAW

For the first time in five years the National Housing Association met in conference in January of this year, and discussed both public and private measures for housing betterment. The most important enactment was the passage by the New York Legislature of the Multiple Dwellings law, superseding the Tenement House law which for 27 years has governed multi-family construction in New York City. The attempt to amend this law in 1927 was frustrated by the opposition of real estate and property interests. Reintroduced this year in amended form, the bill was enacted with the support of those formerly opposing it. Its proponents do not assert that this measure is more than a reasonable attempt to modernize the old statute. On the other hand, Lawrence Veiller, Secretary of the National Housing Association, who drafted the original Tenement House Law in 1901, has said: "There can be no doubt that the new law represents a retrograde movement in housing reform and not an advance." The objections to the bill coming from four different sources were, first, that the provisions for new housing permitted too great height and too much bulk; second, that it failed to set a time subsequent to which the occupancy of dark rooms for living purposes should be prohibited; third, that the law imposed unreasonable burdens in the improvement of old tenement houses; and fourth, that it violated the spirit of home rule and the Constitutional provisions guaranteeing home rule in the cities of the State. Unlike the Tenement House Law its provisions do not govern multi-family construction in Buffalo, which still remains under the old Tenement House Law.

HOUSING FOR WORLD WAR VETERANS

The success of the California plan to provide adequate housing for World War Veterans has resulted in an increased appropriation by the State Legislature. The total funds advanced to date are in excess of $24,000,000. This plan became effective in 1921, when the Legislature enacted the Veterans' Farm and Home Purchase Act, which permitted the Veterans Welfare Board to build or buy homes or small farms for ex-soldiers. The State furnished 95% of the capital required for homes and 90% for farms and further assisted in the selection, planning and supervision of buildings erected.

BUILDING AND HOUSING CODES

In the past year there has been marked improvement in existing building and housing codes in many American cities. This is especially true of the cities of New York State where, as a result of conferences with municipal officials, the New York State Board of Housing is now preparing a model building and housing code for the assistance of those cities and villages that desire to enact adequate housing legislation or to bring their present codes in conformity with present standards.

HOUSING PROJECTS

Cost Experiment.—Valuable experiments in low cost housing have been made in several of the larger cities within the past year. Of these the following are most significant. In Chicago, the Michigan Boulevard Gardens Apartment at 47th and South Michigan Avenue, financed by the Julius Rosenwald Fund, for occupancy by negro families was completed in August. The buildings which occupy a full city block are five stories high, of reinforced concrete faced with brick, in the form of a continuous structure with indented courts, with a uniform cross section two rooms deep and a perimeter length of almost a half a mile enclosing an open court more than two and a half acres in extent planted with trees and shrubbery. There are four hundred and seventeen apartments with one thousand six hundred forty (1,640) rooms. Rents average $17.00 per room per month. The Rosenwald Fund has demonstrated that at this price it is possible to provide buildings of the best type containing very modern convenience, paying full commercial returns with full amortization of the investment.

The Marshall Field housing project north of the Loop, was completed early in the summer. This project consists of ten apartment buildings of reinforced concrete with brick walls, occupying an entire block surrounding a central court 60 feet wide by 800 feet long. The buildings contain 650 apartments of approximately 2,850 rooms which rent for about $16 per room per month. The apartments were built for wage earners of moderate income.

Fireproof Construction.—The Chicago housing projects are particularly valuable in demonstrating the practicability and advantages of fireproof construction for low cost housing of four and five stories in height. While all the facts have not been analyzed with regard to these projects it seems probable that under building laws favorable to economic fireproof construction the small extra cost for fireproofing will be more than offset by a lower cost of maintenance over a reasonable length of years.

New York City.—The success of the first Amalgamated Housing development has resulted in an extension to the original plan, which is now completed. This project, erected under the New York State Housing Law, now represents a total investment of $3,130,000. It contains 2,000 rooms. The buildings are of brick construction, five stories in height and are sold to coöperative owners on an initial payment of approximately $150 per room and an average monthly carrying charge of $11 per room per month.

Brooklyn.—A similar project known as Brooklyn Garden Apartments, sponsored by a Citizens' Committee appointed by the Brooklyn Chamber of Commerce extends from 23rd to 24th Streets, fronting on Fourth Avenue, Brooklyn. This is also a five story structure representing a total investment of $731,000, containing 164 apartments with 677 rooms which rent for $10.60 per room per month. The assured success of this project under the State Housing Law has justified its sponsors in undertaking a second project in the Navy Yard section of Brooklyn, which will contain 91 apartments, aggregating 676 rooms to rent at less than $11 per room per month.

East Side Reconstruction.—The first attempt toward reconstruction of the congested areas of the lower East Side of Manhattan has recently been undertaken by Lieut. Governor Herbert H. Lehman and Aaron Rabinowitz, who is a member of the State Board of Housing. They have acquired two blocks of property on Grand Street, for the erection of a six-story, elevator apartment building to contain approximately 1,000 rooms. The erection will begin as soon as the demolition of the existing buildings, now under way, is completed. The total cost of this project will be $1,500,000. The apartments will be sold to coöperative owners for an initial payment of approximately $150 per room and average monthly maintenance charge of $12.50 per room. With the completion of this project the total investment in new housing for wage-earners erected in the past two years under the terms of the New York State Housing Law will exceed $7,000,000.

SOCIAL HYGIENE

By Ray H. Everett

American Social Hygiene Association

SEX EDUCATION

Change in Public Attitude.—The chief obstacles that lay in the path of sex education in the early days were the inhibitions and shrinking attitude of the adult public with respect to the subject of sex. This unwholesome attitude pervaded all the agencies upon which society today increasingly places responsibility for sex-character training of youth. Great progress has been made in rendering the term sex respectable. This advance was strikingly demonstrated in the recent nationwide discussion aroused by the action of a New York court to bar from the mails as obscene a pamphlet written for the guidance of adolescent boys and girls and used for twelve years by educational and social agencies. Protest against this action, voiced by the press, and by educators, physicians, religious teachers and others, is convincing evidence of the change in the attitude of the public. The general opposition to sex education which has rested upon a low interpretation of the meaning of sex in human life is rapidly crumbling before the educational attack.

Purpose of Sex Education.—Conspicuous progress has been made also in securing the acceptance of a higher conception of the purpose and character of sex education. In the early days the purpose of "sex hygiene," as it was commonly called, was thought to be merely the prevention of immorality among young people. The task was conceived to be mainly one of exposing the young to a certain range of information which could be accomplished in one or two sittings. The teaching was left largely to two groups which stood at opposite extremes. The medical group relied upon presenting "the hard, cold facts" about the dangers of prostitution and venereal disease. The appeal was to fear of consequences. The moralist group tended to sentimentality and exaggeration, and held up "purity" as a vague ideal to be realized. To-day we no longer conceive the purpose of sex education in negative terms. The objective is not merely the avoidance of immorality and its possible physical consequences. The essential objective is self-realization, fullness and richness of life, and social progress.

Writings on Sex.—Striking progress has been made in the quality of sex education materials, especially during the last eight or ten years. The writings of such authors as Ellis, Stanley Hall, Bigelow, Wile, Nora March, Marie Stopes, Maude Royden, Geddes, Galloway, Gruenberg, Exner, Popenoe, Torrey, Groves, Robie and others have marked a striking advance in the popular sex literature. All these writings are now in turn being subjected to the searching spirit of science and their inadequacies shown. One of the most promising advances now under way is the inclusion of subject-matter pertaining to sex and reproduction in the textbooks of schools and colleges.

SEX RESEARCH AND PROGRAMS

Studies.—Marked advance has been made in research. Since Exner's study of college men in 1915 there have followed Hughes's study of the sex experiences of high school boys; Katharine Bement Davis' studies of college women; Hamilton's study of the sex life of married men and women; the work of Allen, Doisy and others on the sex endocrines; the studies of the Committee on Maternal Health of New York; the extensive research program of the Sex Research Committee of the National Research Council, and other important studies.

Y.M.C.A. and Colleges.—In 1912 the Student Department of the International Committee of the Y.M.C.A. at the suggestion of John D. Rockefeller, Jr., developed a bureau for the study and promotion of sex education in the universities and colleges. That bureau undertook to gather the best available thought and experience, to institute a search for facts, and to coöperate with the educators toward the objective of making sex education an indigenous feature of the college curriculum. In 1920 the American Social Hygiene Association took over the work and personnel of the Y.M.C.A. bureau and enlarged the scope of the work to cover all fields. In 1921 the Interfraternity Conference, in coöperation with the American Social Hygiene Association, undertook a study of sex education in the colleges, and in three succeeding annual reports presented certain concrete suggestions to the college authorities. With these experimental outlines as a basis, the American Social Hygiene Association proposed to the presidents of the colleges, in 1924, a joint study of the whole problem of sex education in the colleges. Upward of two hundred universities and colleges appointed social hygiene committees of the faculties for the purpose of coöperating in this study. The findings are now embodied in two reports, and a large proportion of the coöperating institutions are making use of these materials or modifications of them. An increasing number of colleges are organizing special courses on the family, in which the sex factor is dealt with. Probably the most important result of the study has been its influence in directing the attention of a large body of educators to this group of problems and the responsibility of the colleges for them.

High Schools.—Substantial progress in sex education has been made in the high schools, especially in recent years. In 1920 the United States Public Health Service in coöperation with the American Social Hygiene Association undertook a study of the status of sex education in the high schools. The purpose was not alone to get the facts but to direct further attention to these problems. In 1927 this survey was repeated in order to learn what progress had been made during the intervening eight years. In 1920, 54 per cent of the schools reported; in 1927, 43 per cent reported. In 1920, of the schools reporting, 15 per cent had some degree of sex education integrated in broader subjects. In 1927 this had increased to 25 per cent and there is evidence that the work in many schools has been made much more comprehensive and thorough. With advance in integrated sex education the use of emergency measures such as special lectures, posters and pamphlets, has decreased correspondingly. In 1920, 25 per cent of the schools reporting used emergency measures; in 1927 only 16 per cent resorted to them, these measures having been supplanted by more adequate teaching as a regular part of the curriculum.

Teacher Training.—The most significant trend in sex education during the past five years has been the growing demand for teachers' training. Universities, normal schools, summer schools for teachers, state departments of health, state departments of education in considerable numbers are developing systematic courses for training teachers in sex education. It is of interest to note that the Negro institutions are foremost in this matter. Five of the leading Negro institutions of the South, in their summer schools of 1929, conducted eight courses in sex education for teachers.

Religious Coöperation.—The whole field of religious education which until recent years lagged behind other interests in this matter, is now rapidly opening its character-education channels to take account of the sex factor. The Federal Council of Churches and many other religious agencies are working in close coöperation with the American Social Hygiene Association to this end. Some of the theological seminaries are including a study of sex-social problems in their courses of training. Some of the denominational gatherings and schools are doing the same. Churches in growing numbers are conducting study groups for the training of church workers and of parents for their responsibilities in sex education, and similar studies for adolescent boys and girls, and for the older youth in preparation for marriage. The Y.M.C.A. and the Y.W.C.A. are among the outstanding religious agencies making constructive use of this phase of character education. The Department of Christian Social Service of the Protestant Episcopal Church is introducing religious and scientific instruction for marriage into the regular program of every parish. A series of Family Relations Institutes are being conducted at which the clergy will be given a training course in the conduct of marriage preparatory classes.

Parent-teacher Agencies.—An important feature of the growing sex education movement is its outreach in recent years through the parent-teacher agencies. For some years the National Congress of Parents and Teachers has included sex education as an important feature of its program. Operating through social hygiene committees of the state organizations, the National Congress seeks to develop state programs that shall in turn stimulate the local units to practical measures in reaching the schools on the one hand and the homes on the other. While progress in the home is more difficult to measure, we have abundant evidence that in no other field have more surprising changes of attitude taken place and more practical efforts been initiated. This is true in no small measure even among the older generation of parents. The younger generation of educated parents is keenly alive to their responsibility.

MEDICAL AND PUBLIC HEALTH MEASURES

Change in Medical Attitude.—A striking picture of progress is presented when one reviews the trend of diagnosis, treatment, and social follow-up of syphilis and gonococcus infections over the past twenty years. Where, formerly, the majority of practicing physicians in good standing were reluctant to treat these cases, there now are many outstanding specialists and general practitioners both competent and willing to do so. Where, formerly, the indigent sufferer either begged advice or went untreated—a menace to public health—there now are free or low-cost clinics in most communities where he can obtain the needed treatment.

Public Health Safeguards.—Virtually every state and large city has in its health department some bureau or officer whose duty it is to promote measures for safeguarding the public from syphilis and gonorrhea and to locate and arrange treatment for those infected. National recognition, also, was given to these measures through the institution in 1918 of the Division of Venereal Disease in the United States Public Health Service.

Medical Research.—In the field of research, a series of most basic discoveries have been made in the past twenty years. The isolation of the organism of syphilis, salvarsan and its various modifications, tryparsamid and malarial therapy in the treatment of neuro-syphilis, and the Wassermann and Kahn serological tests are but a few of the more notable ones. The Committee on Research in Syphilis (United States) is stimulating and aiding further research activities.

Institutional Work.—The most significant item of progress in the field of social hygiene medical and public health activities is the rapidly increasing interest in this field manifested by medical, nursing, and public health educational institutions. These training agencies are broadening their curricula so as to include, in addition to the strictly medical and nursing teaching, some attention to the social factors involved. They are giving increased attention to such vital matters as examination and, when needed, treatment of those members of the family or community who may have come into contact with the infected individual; pre-natal treatment for syphilitic pregnant women; immediate disinfection of the eyes of the new born baby to guard against gonorrheal opthalmia (blindness); pre-marital advice for those who are or have been infected; and other subjects which affect not only the welfare of the individual patient but that of society.

LEGAL AND PROTECTIVE MEASURES

The Fight against Prostitution.—Commercialized prostitution has been greatly diminished in the United States and there are but few communities which now tolerate its existence. Facts and supporting data resulting from scientific investigations prove that commercialized prostitution is a wholly unnecessary evil, a detriment to law and order, a wholesale source of venereal infection, and a menace to the moral stamina of those who come in contact with it. These indictments are based on sound conclusions and recommendations by trained investigators in studies sponsored by such agencies as the United States Interdepartmental Social Hygiene Board, United States Department of Justice, Bureau of Social Hygiene, Chicago Committee of Fifteen, New York Committee of Fourteen and, internationally, by the League of Nations' Special Body of Experts on Traffic in Women and Children. In the United States, 26 municipal commissions have reported on the problem. The American Social Hygiene Association has coöperated in many of these studies and has constantly furnished reliable information on the status of commercialized prostitution in all sections of the United States. In addition to this field-study service, the Association has aided states and communities to secure sound legislation, and has been largely responsible for the education of the public on the problems involved. Through pamphlets, lectures, motion pictures, and the *Journal of Social Hygiene* an effective public information service has been maintained.

Protective measures in the social hygiene field are gaining a greatly increased amount of attention from civic officials and voluntary groups who realize the need for a program which will assure wholesome, rather than destructive, surroundings for youth. As Henrietta Additon sees it, "effective laws and law enforcement, and socialized courts and proper facilities for institutional care are important and necessary, but protective measures for the prevention of delinquency must provide, also, opportunities for wholesome recreation, new ideals in school and industry, and an improvement of general community conditions."

Some of the more essential protective measures for the prevention of delinquency are: (a) desirable and adequate public and private recreational opportunities, and commercial amusement places properly supervised; (b) trained policewomen qualified by personality and education for protective work; (c) services being developed by child guidance clinics, vocational adjustment bureaus, visiting teacher associations and voluntary social agencies concerned with the adolescent; (d) child labor legislation enforced and minimum standards for children entering employment similar to those worked out by the United States Children's Bureau's Conference in 1919; (e) a juvenile court equipped to deal with children's cases in every community and courts dealing with older boys and girls and adult sex delinquents, and efficient, honest judges, and probation officers appointed through the merit system; (f) all detention places for juveniles and adults be decent, sanitary, and adequately equipped, and reformatory institutions providing segregation, care and training, and parole supervision for sex delinquents, in a truly correctional fashion.

MENTAL HYGIENE

BY GEORGE K. PRATT

ASSISTANT MEDICAL DIRECTOR, NATIONAL COMMITTEE FOR MENTAL HYGIENE

MEETINGS AND LECTURES

Anniversary Dinner and Meeting.—The twentieth anniversary of the founding of the national mental hygiene movement in the United States was observed at a dinner held at the Biltmore in New York Nov. 14, and was attended by a distinguished assemblage of over 600 members and guests who came from some 80 cities. Dr. William H. Welch, Director of the Department of The History of Medicine, Johns Hopkins University, and Honorary President of The National Committee for Mental Hygiene, presided. Speakers included Dr. James R. Angell, President of Yale University; Dr. William A. White, Superintendent of St. Elizabeths Hospital in Washington, D. C.; Dr. Frankwood E. Williams, Medical Director, The National Committee for Mental Hygiene; and Clifford W. Beers, Founder and Secretary of The National Committee for Mental Hygiene. A résumé of the accomplishments during the past twenty years was given on what was characterized by Dr. Welch as "an historic occasion." The progress in mental hygiene during these twenty years has been astonishing, for in that time a world-wide movement has come into being from a small nucleus established first in 1909.

International Congress.—One of the most significant activities of the mental hygiene movement during 1929 was the fruition of plans for the First International Congress on Mental Hygiene, to be held in Washington, May 5-10, 1930. Delegates from 39 foreign countries have been invited to this Congress and concurrently will be held the annual meetings of the American Association for the Study of the Feebleminded, the American Psychiatric Association and others.

Salmon Memorial Lectures.—A memorial to the late Dr. Thomas W. Salmon, first medical director of The National Committee for Mental Hygiene, and one of the Nation's outstanding psychiatrists, has been created. The memorial will take the form of an annual lecture or series of lectures to be given by leaders in psychiatry and mental hygiene, both here and abroad, and will be financed from an endowment fund of $100,000 or more. Arrangements have been made by the Memorial Committee with the New York Academy of Medicine to administer the details of the memorial.

PSYCHIATRIC WORK

Drug Addicts.—The United States Public Health Service during the past year has committed itself to the establishment of two Federal narcotic farms for the care and treatment of drug addicts, as provided for by Congress. It is significant that this undertaking is under the direction of the Psychiatric Division of the United States Public Health Service, which accepts the consensus of contemporary medical opinion that drug addiction is essentially a mental problem to be dealt with along medical lines, as well as legal lines.

The Army.—During the past summer the War Department published Volume X of the *Medical Department of the United States Army in the World War,* the official history of the medical and surgical services of the Army here and overseas during the great conflict. Volume X deals with the work done by the Army psychiatrists and neurologists and constitutes an astonishing revelation of the importance of psychiatric work during the World War.

The Prisons.—An interesting field study was made in 1929 by the National society for Penal Information in coöperation with The National Committee for Mental Hygiene. This study included a careful survey of medical (including psychiatric) facilities in prisons, penitentiaries and corrective institutions throughout the country. The study brought forth data of a highly valuable nature and it is expected that part of this data will be found useful by various crime commissions in formulating new policies with regard to the psychiatric care and treatment of convicted prisoners in institutions.

PERSONNEL

The problem of discovering and training personnel for technical work in mental hygiene continues to be acute. During 1929 eight fellowships for training in extramural psychiatry and mental hygiene were awarded to properly qualified physicians, while two additional fellowships for training in the child guidance aspects of clinical psychology were given to properly qualified psychologists. In each instance, as before, these fellows were placed in important mental hygiene and psychiatric positions immediately upon the termination of their training period. In the face of multiplying demands for mental hygiene service and advice on the part of many organizations and individuals concerned with mental health problems, it is becoming more and more impossible to supply anything like the number of technically trained people needed for this work. The fundamental problem would appear to be one of devising ways and means to attract medical students to the subject of psychiatry and also to stimulate medical schools to make greater provision for the teaching of an up-to-date type of psychiatry.

CHILD GUIDANCE AND PROBLEMS

Clinics.—Child guidance (mental hygiene) clinics are no longer an experiment and most of the larger cities in the country, as well as numerous smaller ones, have established such clinics. For the most part these clinics deal, not so much with feebleminded and retarded children, as they deal with so-called "normal" children who nevertheless present a variety of behavior or personality problems which to-day are widely recognized as often being the precursors of some form of mental maladjustment later in life. During 1929 5 new child guidance clinics have been developed in New Orleans, Houston, Tex.; Indianapolis, in the State of Delaware and in Connecticut. Each of these clinics has been established in conformity with the high standard of requirements of the division on Community Clinics of The National Committee for Mental Hygiene. In addition to the establishment of these new clinics a number of existing clinics have been augmented in size, in the number of personnel, as well as in the amount of service they render to the community. More and more is it being recognized that second only to the service they render to the maladjusted child is the educational value of such a clinic in a community. They serve as training centers for social workers, psychologists, and psychiatrists, and, as such, become closely integrated with the progress of virtually all of the social sciences, thus rendering untold service.

Parent-teacher Work.—The National Congress of Parents and Teachers has been interested for several years in mental hygiene problems of children. In order to lend shape and direction to its efforts, it has created a special section on mental hygiene with a psychiatrist serving as chairman. During 1929 the chairman of this committee worked out a mental hygiene study course for the use of parents and teachers especially in communities where local psychiatric assistance is not available. This study course is available to all of the 1,500,000 members of the Parent-Teacher organization, and it is expected that it will fill a much needed want in the field of adult education in mental hygiene.

RESEARCH AND STUDY

New York.—An important and exhaustive research study was conducted in 1929 by The National Committee for Mental Hygiene of mental hygiene facilities and resources in Greater New York. The study was divided into four sections: a. mental hygiene facilities in public schools; b. mental hygiene clinics attached to hospitals and dispensaries; c. mental hygiene facilities in the courts, both adult and juvenile, and d. mental hygiene facilities of social welfare agencies. As a result of valuable data disclosed by this study, it has been possible for a number of organizations interested in mental hygiene work to begin the formulation of a city-wide program of mental hygiene that will insure to the citizens of New York City adequate service, both quantitatively and qualitatively, for the prevention and treatment of mental disorders. As an outgrowth of the New York City study, similar studies at the close of 1929 are projected for Boston and for Chicago with the same aim in view.

Colleges and Universities.—Mental hygiene work in colleges and universities continues to grow in interest and in size. In fact, it has been necessary to discourage many enthusiastic plans for the establishment of this work in colleges until assurance of adequate, trained psychiatric personnel can be made. In September, 1929, the Committee on the Cost of Medical Care cooperated with The National Committee for Mental Hygiene in making a study of the incidence of mental and emotional disorders among Freshmen students in a series of selected universities and colleges throughout the country. At most of these institutions, students, on entering, are given physical examinations, but except in relatively few places have such examinations in the past included attention to mental or emotional factors. It is hoped that this study will reveal data that will make it possible to ascertain with some reasonable degree of certainty the type of emotional adjustment or maladjustment to be expected during the collegiate careers of entering students.

CHILD WELFARE

By C. C. Carstens

Child Welfare League of America

CONDITIONS OF EMPLOYMENT

Better Standards.—During the year, forty-four states held legislative sessions. Many bills aimed at better standards in child welfare were presented but few important measures became law. The National Child Labor Committee celebrated the twenty-fifth anniversary of its founding. It has doubtless been the most potent force for bringing about better local standards of employment for children in the various states. At present two states (Montana and Ohio) have a minimum working age of sixteen years; six states (California, Idaho, Maine, Michigan, Rhode Island and Texas) of fifteen; all the other states (excepting Utah and Wyoming, which have no age minimum) have fourteen. Of the whole group, however, a number of states have exemptions permitting work at an earlier age during school hours.

Work Hours.—Twenty-five states now have an eight-hour day and a forty-eight hour week for most occupations, while four states (Mississippi, New York, New Mexico and Virginia) have an eight hour day and a forty-four hour week. Thirteen states forbid work after 6 p. m. for children under sixteen but of these seven permits serious exemptions. Twenty-four others forbid work after 7 p. m. of which six have serious exemptions. During 1929, Missouri, Illinois and Maryland increased their educational requirements for the issuing of work certificates.

Workmen's Compensation.—North Carolina adopted its first Workmen's Compensation Act under which minors whether legally or illegally employed are included in its benefits. Four states still remain without a workmen's compensation law.

INFANT MORTALITY

Death Rates.—In the birth registration area, which now includes Nevada and with only three states remaining outside, the infant mortality in 1928 was 68.3 for 1,000 live births for 718 cities of 10,000 or more. This is three points higher than last year's, the lowest point reached, but is only two-thirds of the rate of fifteen years ago. Of the cities 250,000 and over, Seattle, Washington, and Portland, Oregon, reported the lowest rate, 43, and Denver, the highest, 91. Of cities containing 100,000 to 250,000. inhabitants Oakland, California, reported the lowest, 47 infant deaths; Atlanta, Georgia, the highest, 100. In cities with a population of 10,000 to 25,000, Holland, Michigan, reported the lowest, 21 and Dunmore, Pennsylvania, the highest, 206, also the highest for all of the cities. Of the ten largest cities, New York City reported the lowest, 59, Chicago and St. Louis next, 64, Philadelphia, 71, Detroit and Boston, 77.

Causes. — Seattle, Washington, which shares with Portland, Oregon, the lowest infant mortality rate in 1928 reports that 57 per cent of the infant deaths came from three causes which can be controlled—prematurity, injuries at birth, and pneumonia. Records also showed that nutritional disturbances and intestinal diseases formerly so common accounted for less than one per cent and infectious diseases were a negligible factor. The Pennsylvania Department of Health reports that the measles death rate for children under five per 100,000 population has dropped from 115 in 1907 to 19.2 in 1927; scarlet fever from 67.3 to 9.3; whooping cough from 138.6 to 36.3; diphtheria from 163.4 to 45; and all forms of tuberculosis from 103.5 to 36.6. Heart disease is said to be increasing among children between the ages of ten and fourteen and to be the principal cause of death in this age period.

HEALTH STATIONS FOR CHILDREN

A much needed baby health station has been established among the 50,000 to 60,000 Porto Ricans in their Harlem colony in New York. Likewise, a health center building is being erected in the North Harlem section of New York which has the largest colored population in any community in the world. In that section the ten most serious communicable diseases show twice the rate of the city as a whole. The infant death rate there is 124, twice the rate among white children in the city.

PROTECTIVE MEASURES

Laws for Special Care.—A new children's code relating to dependent, neglected and delinquent children became law in Wisconsin. The appointment of a commission was authorized by the Massachusetts legislature to investigate laws relating to dependent, neglected and delinquent children and to others in need of special care. The New York legislature passed a statute requiring the consent of a judge of the children's court as well as that of the parents for the issuing of marriage licenses for girls under sixteen.

Day Nurseries.—The tendency to develop additional boarding home care in various communities led the First Day Nursery of Philadelphia to dispose of its institution and place its children for day care in foster homes.

Of 200 families involving 362 children, only 62 of 30 families following careful investigation actually needed the service. The other 170 families could be better served in other ways.

Placement of Delinquents. — A group of 355 cases of placement of delinquent children or those having personality difficulties were analyzed in Massachusetts. Success was reported in 190 out of 217 having normal mentality, and 46 out of 102 having abnormal mentality or personality difficulties, and in 14 out of 20 cases classified as defective. In 16 cases the results were undetermined.

ORPHANAGES AND SCHOOLS

The Cincinnati Orphan Asylum organized to care for children orphaned by the scourge of cholera which swept that city from 1830 to 1832, finding its number shrinking, has decided to devote its resources in the future to convalescent children.

Negro Education. — About 4406 schools in the Southern States for negro education varying in size from one to ten rooms have been built through the stimulus and financial and other assistance provided by Julius Rosenwald. Tax funds, gifts from white neighbors, from the Negroes themselves and from Mr. Rosenwald have made up the total budgets.

Parental Courses.—At least 47 institutions in 29 states gave summer courses in parental education, child study and allied subjects. Of these 17 conducted nursery schools as laboratories for students of child development. Others placed the emphasis on the training of the parents themselves for the care of their children.

Recently published figures indicate that of every 1000 pupils entering public schools the first 95 children reach the sixth grade, 795 the seventh, 720 the eighth. Of the original 1,000 school entrants the number entering the first year of high school was 605 of whom 247 graduate. This is nearly double the number per 1000 graduating in 1918.

Adoption.—Under a statute recently passed in California, an investigation of every petition for adoption must be made by the State Department of Social Welfare or by one of the two private child-placing agencies licensed for that purpose.

CHILD CRIME STUDY

The New York State Crime Commission's tenth report states that of its examination of 80 boys between the ages of ten and seventeen, forty of whom were problem boys, the rest, brothers not representing problems, the problem boys show a lower intelligence rating than their non-problem brothers. Though inferior to their non-problem brothers in school they were superior in mechanical ability. Stealing was found to be a symptom of a graver and deep maladjustment. More individual treatment was recommended. The Advisory Council on Crime Prevention of Massachusetts who made a two-year study of 1200 normal children from the public schools who had records as youthful offenders, report the belief that crime can be prevented; and they recommend supervision of boys from the time they leave school until they secure jobs, more mental clinics and the promotion of boys' clubs. A survey of crime detection and prevention has been undertaken under the auspices of the Columbia University Law School.

ENDOWMENTS

Couzens Fund. — Senator James Couzens has established the Children's Fund of Michigan with an endowment of ten million dollars and with a program to assist in the development of better child health, mental hygiene, recreation and care for dependents and delinquents all over the state. It is notable that according to the terms of the gift the Fund is to be entirely used up in twenty-five years.

Ellis Will.—An effort to obtain a more liberal interpretation of the will of Charles E. Ellis of Philadelphia providing a trust fund for the education and maintenance of white fatherless girls under thirteen years of age, and directing the establishment of a school for this purpose. (Ellis College), has ended in failure. It was hoped that part of the resources could have been used for aiding suitable dependent mothers to keep their children at home with them.

HUMANITARIAN WORK

The Institute of Human Relations at Yale University has been established and one of its first studies will be that of the family factors in child adjustment for which the collective integrated resources of the medical school, law school, institute of psychology and various psychiatric and social facilities will be available in a manner not before possible for such a study.

White House Conference.—The President of the United States has announced the organization of the White House Conference on Child Health and Protection, the conference to be held in about a year after careful preparation. The sections are I. Medical Care, II. Public Health Service, III. Education and Training, IV. The Handicapped. The results should be interesting and helpful.

COGNATE SOCIETIES

JUSTICE AND MAINTENANCE OF ORDER

AMERICAN BAR ASSOCIATION, Section on Criminal Law, Endicott Bldg., St. Paul, Minn.

AMERICAN CIVIL LIBERTIES UNION, 100 Fifth Ave., New York, N. Y.

AMERICAN COUNCIL OF LEARNED SOCIETIES, 597 Fifth Ave., New York, N. Y.

AMERICAN INSTITUTE OF CRIMINAL LAW AND CRIMINOLOGY, 357 E. Chicago Ave., Chicago, Ill.

AMERICAN LAW INSTITUTE, 3400 Chestnut St., Philadelphia, Pa.

AMERICAN PRISON ASSN., 135 E. 15th St., New York, N. Y.

NATIONAL COMMITTEE ON PRISONS AND PRISON LABOR, 730 Fifth Ave., New York, N. Y.

NATIONAL CRIME COMMISSION, 120 Broadway, New York, N. Y.

NATIONAL POLICE CONFERENCE, 240 Centre St., N. Y. C.

NATIONAL PROBATION ASSN., INC., 370 Seventh Ave., New York, N. Y.

NATIONAL SOCIETY OF PENAL INFORMATION, 114 E. 30th St., N. Y. C.

SOCIETY FOR THE PREVENTION OF CRIME, 177 William St., New York, N. Y.

WOMEN'S PRISON ASSN., 110 Second Ave., New York, N. Y.

SOCIAL ORGANIZATIONS

AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE, 3622 Locust St., West Phila., Pa.

AMERICAN NATIONAL RED CROSS, 17th and D Streets, N.W., Washington, D. C.

AMERICAN SEAMEN'S FRIEND SOCIETY, 72 Wall St., New York, N. Y.

AMERICAN SOCIETY FOR THE PREVENTION OF CRUELTY TO ANIMALS, 50 Madison Ave., N. Y. C.

AMERICAN SOCIETY FOR THRIFT, 9 East 46th St., New York City.

BOYS' CLUB FEDERATION, 420 Lexington Ave., New York, N. Y.

BOY SCOUTS OF AMERICA, 2 Park Ave., New York City.

CHILDREN'S AID SOCIETY, 105 E. 22nd St., New York City.

CIVIC FORUM, 123 W. 43rd St., New York, N. Y.

FEDERAL COUNCIL OF CHURCHES, ETC. —Commission on the Church and Social Service, 105 East 22nd Street, New York City.

GIRLS FRIENDLY SOCIETY IN AMERICA, 15 E. 40th St., New York City.

GIRLS SERVICE LEAGUE OF AMERICA, 138 E. 19th St., New York City.

HUMANITARIAN LEAGUE, INC., 131 W. 74th St., New York City.

HUMAN PROGRESS ASSN., 220 W. 42nd St., New York City.

INTERCOLLEGIATE SOCIALIST SOCIETY, 70 Fifth Ave., New York City.

NATIONAL CATHOLIC WELFARE CONFERENCE, 1312 Mass. Ave., N.W., Washington, D. C.

NATIONAL CONFERENCE OF SOCIAL WORK, 25 E. 9th St., New York City.

NATIONAL CONFERENCE FOR THE SOCIAL STUDIES, 671 Park Ave., New York City.

NATIONAL INSTITUTE OF SOCIAL SCIENCES, 280 Madison Ave., New York City.

Young Men's Christian Assn., International Committee, 347 Madison Ave., N. Y. C.

SOCIAL FRATERNITIES

Allied Patriotic Societies, Inc., 299 Madison Ave., New York City.

Ancient & Accepted Scottish Rite of Freemasonry,—Northern Jurisdiction, 117 Statler Building, Boston, Mass.—Southern Jurisdiction, 1733-16th St., Washington, D. C.

Benevolent and Protective Order of Elks of the U. S. A., 2750 Lake View Ave., Chicago, Ill.

Independent Order of Odd Fellows, 12 West Chase St., Baltimore, Md.

International Advertising Assn., 420 Lexington Ave., New York City.

International Assn. of Lions Clubs, 350 McCormick Bldg., Chicago, Ill.

Kiwanis International, 164 W. Jackson Blvd., Chicago, Ill.

Knights of Columbus, P.O. Box 1670, New Haven, Conn.

Knights of the Ku Klux Klan, Inc., 2621 Peachtree St., Atlanta, Ga.

Knights of Pythias, 754 Security Bldg., Minneapolis, Minn.

Loyal Order of Moose, Mooseheart, Ill. (Supreme Lodge of the World).

Modern Woodmen of America, 1504 Third Ave., Rock Island, Ill.

Royal Arcanum Supreme Council, 407 Shawmut Ave., Boston, Mass.

Rotary International, 211 W. Wacker Drive, Chicago, Ill.

Woodmen of the World, Sovereign Camp, 14th and Farman Sts., Omaha, Neb.

(SOCIAL) HOME LIFE

Landlords' Coöperative Assn., 116 Nassau St., New York City.

National Housing Assn., 105 E. 22nd St., New York City.

National Plant, Flower & Fruit Guild, 70 Fifth Ave., N. Y. C.

New York Assn. for Improving the Condition of the Poor, 105 E. 22nd St., New York City.

Own-Your-Home Educational Campaign Foundation, 524 First Ave., New York City.

Own-Your-Home League, Inc., 151 W. 33rd St., New York City.

(SOCIAL) CHILDREN

Big Brother Movement, Inc., 315 Fourth Ave., New York City.

Big Brother and Big Sister Federation, Inc., 425 Fourth Ave., New York City.

Camp Fire Girls, Inc., 31 E. 17th St., New York City.

Child Conservation League of America, 205 W. Monroe St., Chicago, Ill.

Child Welfare League of America, 130 E. 22nd St., New York City.

Children's Aid Society, 105 E. 22nd St., New York City.

Hebrew Sheltering Guardian Society of New York, Pleasantville, N. Y.

National Child Labor Committee, 215 Fourth Ave., New York City.

National Child Welfare Assn., 70 Fifth Ave., New York City.

Santa Claus Assn., Inc., 152 W. 42nd Street, New York City.

(SOCIAL) HEALTH

American Birth Control League, 104 Fifth Ave., New York City.

American Child Health Assn., 370 Seventh Ave., New York City.

American Mission to Lepers, 156 Fifth Ave., New York City.

American Posture League, Inc., 1 Madison Ave., New York City.

American Social Hygiene Assn., Inc., 370 Seventh Ave., New York City.

Anti-Cigarette League of New York State, 209 W. 107th St., New York City.

Benevolent Society of the U. S. for the Propagation of Cremation, 1828 Barnes St., New York City.

Committee on Dispensary Development, 151 Fifth Ave., New York City.

Eugenics Research Assn., Cold Spring Harbor, L. I., N. Y.

National Committee for the Disabled, 245 E. 23rd St., New York City.

National Health Council, 370 Seventh Ave., New York City.

National Housing Assn., 105 E. 22d St., New York City.

Playground and Recreation Assn. of America, 315 Fifth Ave., New York City.

(SOCIAL) MORALS

American Assn. of Social Workers, 130 E. 22nd St., New York City.

American Fund for Public Service, Inc., 2 W. 13th St., New York City.

American Humane Assn., 80 Howard St., New York City.

Anti-Profanity League, Ware, Mass.

Charity Organization Society of the City of New York, 105 E. 22nd St., N. Y. C.

Chicago Crime Commission, 300 W. Adams St., Chicago, Ill.

Morality League of America, 222 Madison Ave., N. Y. C.

National Christian League for Promotion of Purity, 5 E. 12th St., N. Y. C.

National Committee for Better Films, 70 Fifth Ave., N. Y. C.

National Save-A-Life League, Inc., 50 E. 42nd St., N. Y. C.

New York Society for the Suppression of Vice, 215 W. 22nd St., New York, N. Y.

Non-Smokers' Protective League of America, 101 W. 72nd St., New York City.

Safety First League, 47 W. 47th St., New York City.

Travelers' Aid Society of N. Y., 144 E. 44th St., New York City.

(SOCIAL) TEMPERANCE

Anti-Saloon League of America, 370 Seventh Ave., New York City.

Association Against the Prohibition Amendment, Room 935-941, National Press Bldg., Washington, D. C.

Catholic Total Abstinence Union of America, Pittsburgh, Pa.

International Narcotic Crusade, Inc., 156 Fifth Ave., New York City.

Moderation League, Inc., 385 Madison Ave., New York City.

National Temperance Society, 289 Fourth Ave., New York City.

World League Against Alcoholism, 150 Fifth Ave., New York City.

FOUNDATIONS

Carnegie Endowment for International Peace, 2 Jackson Place, Washington, D. C.

Carnegie Foundation, 522 Fifth Ave., New York City.

Carnegie Hero Fund Commission, 2307 Oliver Bldg., Pittsburgh, Pennsylvania.

Carnegie Institution of Washington, 16th and P Sts., N. W., Washington, D. C.

General Education Board, 61 Broadway, New York City.

Guggenheim Foundation, 551 Fifth Ave., New York City.

Hall of Fame for Great Americans, University of the City of N. Y., N. Y. C.

Laura Spellman Foundation, 607 Hudson St., New York City.

Moro Educational Foundation, 475 Fifth Ave., New York City.

Rockefeller Foundation, 61 Broadway, N. Y. C.

Rockefeller Institute, York Ave. & 66th St., New York City.

Roosevelt Memorial Assn., 28 E. 20th St., N. Y. C.

Russell Sage Foundation, 130 E. 22nd St., New York City.

Woodrow Wilson Foundation, 6 E. 39th St., New York City.

WOMEN'S WORK AND PROGRESS

American Association of University Women, 1634-I St., N. W., Washington, D. C.

American Nurses' Assn., 370 7th Ave., New York City.

American Women's Assn., Inc., 220 Madison Ave., New York City.

Church Women's League for Patriotic Service, Inc., 132 E. 57th St., N. Y. C.

General Federation of Women's Clubs, 1734 N. St., N. W., Washington, D. C.

National American Woman Suffrage Assn., 171 Madison Ave., New York City.

National Assn. of Women Painters and Sculptors, 17 E. 62nd St., N. Y. C.

National Council of Administrative Women in Education, 1211 Gilpin Ave., Wilmington, Delaware.

National Council of Women, U. S. A., 370-7th Ave., N. Y. C.

National Federation of College Women, Rolla, Mo.

National League of Girls' Clubs, 472 W. 24th St., New York City.

National League of Women Voters, 532 Seventeenth St., N. W., Washington, D. C.

National Woman's Christian Temperance Union, 1730 Chicago Ave., Evanston, Ill.

National Woman's Relief Corps, 64 Spring St., Oberlin, Ohio.

National Woman's Party, 21 First St., N. E., Washingtou, D. C.

Professional Women's League, 56 W. 53rd St., New York City.

Southern Women's Educational Alliance, Hotel Richmond, Richmond, Va.

Women's Christian Temperance Union, 1730 Chicago Ave., Evanston, Ill.

Women's Educational and Industrial Union, 264 Boylston St., Boston, Mass.

Woman's Roosevelt Memorial Assn., Roosevelt House, 28 E. 20th St., New York City.

Women's Trade Union League, 247 Lexington Ave., New York City.

DIVISION XVI

LABOR AND LABOR LEGISLATION

CONDITIONS OF LABOR AND LABOR ORGANIZATIONS

By Ethelbert Stewart

Commissioner of Labor Statistics, Department of Labor

GENERAL

It may be said that, in spite of setbacks here and there, organized labor more than held its own during 1928-29. As shown by voting strength, the membership of the American Federation of Labor increased from 2,938,500 to 3,040,600. Working hours have been cut somewhat, and numerous (in some instances considerable) wage increases have been won by the organized trades.

Unlike 1927, the year at present under review presented no very severe judicial defeats, while in the field of labor legislation labor has two victories to its credit, namely, the Wisconsin anti-union contract law and the Federal convict labor law. One social measure, the public old-age pension, which is solidly supported by organized labor, is receiving more and more attention by legislatures, and four new states have during the past year been added to those which already had legislation on the subject. The passage of a workmen's compensation law was achieved in North Carolina.

The problem of organization of the unorganized workers remains as formidable as ever, and new problems of labor displacement by machinery and mass production are becoming acute. In certain individual industries the economic condition of the workers has become worse instead of better and in some cases the union is encountering extreme hardship.

WAGES AND HOURS OF LABOR

Five-day Week.—Very considerable progress was made toward the five-day week during the year under review. Its extension has been rapid in the organized building trades, and early in 1929 an agreement in New York City extended it to some 150,000 additional workers. The men's clothing industry remains in the lead, however, more than half of the shops and about one-third of the employees working on this basis. Other organized trades which have made recent progress toward the five-day week include granite and stone cutters, linemen, the printing trades, boot and shoe workers, fur workers, wood carvers, upholsterers, and pocket-book workers.

Six-Hour Day.—The engine and train service railroad brotherhoods are launching a concerted drive for the 6-hour day, the success of which it is impossible to predict. They claim that due to mechanical improvements and increased labor efficiency "one engine crew and one train crew are doing the work which formerly required five engines crews and five train crews" and that 350,000 railroad men have been thrown out of employment in the last nine years. The 6-hour day is advocated "to give employment to the victims of the modern machine."

Union wage rates in the principal time-work trades showed numerous advances from 1928 to 1929. The printing-trades workers were perhaps the most fortunate. The compositors on book and job work won increases in the union scale in 9 cities, and those on day work on newspapers in 16 cities. The machine typesetters on book and job work won increases in 9 cities, while those on newspaper work obtained increases in 14 cities but were forced to accept a wage cut in 1 city. The increases of compositors ranged from 1.1 to 7.4 cents per hour, while the one decrease amounted to 4.8 cents per hour. The electrotypers and molders had scales increased in 6 cities, but suffered a decrease in 2 cities, while the electrotypers and finishers, also had 6 increases and 1 decrease. The increases for electrotypers ranged from 2.3 to 4.6 cents per hour, while the decreases amounted to 5.7, 11.4 and 5.7 cents, respectively.

Organized Building Trades.—The rates remained, for the most part, unchanged, but bricklayers in 4 cities negotiated agreements carrying increases ranging from 6.2 to 12.5 cents per hour; in another city, however, the rate was cut 12.5 cents per hour. Carpenters secured increases ranging from 6.2 to 12.5 cents per hour in 5 cities, but were reduced 10 cents in 1 city. Organized cement finishers' hourly rates were increased from 5 to 12.5 cents in 3 cities but reduced 25 and 37.5 cents, respectively, in 2 cities. Inside wiremen succeeded in obtaining increases in 10 cities, ranging from 5 to 15 cents per hour; in no instance was a reduction made. The union scales of plumbers were increased in 7 instances and decreased in 1 case, the increases ranging from 5.2 to 15 cents per hour, while the decrease amounted to 20 cents per hour. Other trades which made a few gains were the granite cutters, painters, sheet-metal workers, stone-cutters, and structural-iron workers.

Railway Rates.—The railroad workers of various occupations carried on a general movement for wage increases, which were almost all successful, though the rates of increase obtained varied on the different roads and for the various classes of workers. The increases of the railway clerks averaged about 3 cents per hour, those obtained by the shopmen about 5 cents per hour (8 cents in one instance), those of the train dispatchers about $10 per month, telegraphers 2½ to 5 cents per hour, signalmen from 3 to 5 cents per hour, etc. The street-railway employees in a number of cities received increases either by agreement or as a result of arbitration proceedings.

Vacations with pay are increasingly being made a part of collective agreements, and cover many local trades, including those of the bakers, brewery workers, commercial telegraphers, electrical workers, hotel and restaurant employees, marine firemen and oilers, meat cutters, railway clerks, retail clerks, sailors, stenographers, bookkeepers, street-railway employees, telephone operators, teamsters and chauffeurs, train dispatchers, printers, and railroad yardmasters.

COURT DECISIONS AND LEGISLATION

Injunctions.—No strikingly important decisions affecting labor were made during 1928-29. A number of injunctions were issued in labor disputes, almost always to the restraint of the strikers, though the Supreme Court of Illinois held that the employees concerned are equally with the employer entitled to the protection of the injunction. Organized labor continues its drive against the use of injunctions in such cases and is unitedly behind the recast Shipstead Bill, regulating their use, which was introduced into the Congress of 1928.

Detective Licensing.—The Wisconsin law requiring the licensing of private industrial detectives was declared constitutional by the Supreme Court of the State.

Union Organization.—The refusal of union employees to work with non-union workers and the attempts of the Union peaceably to organize the latter were upheld by the District Court for the Southern District of New York in the case Aeolian Co. et al *vs.* Jacob Fisher et al.

"Yellow Dog" Contracts.—The 1929 session of the Wisconsin Legislature passed a law prohibiting the so-called "yellow dog" contract whereby employers have required that their workers contract not to be or become a member of a labor organization, and providing that any such contract shall be void, as contrary to public policy.

Such bills have been introduced into the legislatures of several states and have the support of organized labor, but this is the first act of its kind ever passed by any American state.

Labor Acts.—The subject of convict labor received legislative attention in several states, and Congress passed a Federal Act which divests convict-made goods of their interstate character. Since the beginning of 1929, four states (California, Minnesota, Utah, and Wyoming) have passed old-age pension laws, and Wisconsin amended the existing law on the subject. Many states have amended their workmen's compensation laws and North Carolina passed its first one dealing with this subject. Other labor legislation passed by the states during the year under review has dealt with the subjects of contract of employment, private employment offices, wages, hours of labor, child labor, and safety.

RELATIONS BETWEEN CAPITAL AND LABOR

Controversies.—The year 1928 showed fewer controversies between capital and labor than any year since the Bureau of Labor Statistics began the compilation of strike data (1916). Only 629 strikes occurred during the year, a decrease of 105 from the year before, and a considerable fall from 1917 when 4,450 strikes took place. Some 360,000 workers were involved in these disputes during 1928, as against 349,434 in 1927 and 1,612,562 in 1922. The first half of 1929 shows a considerable increase in strikes, 437, as compared with 336 in the same period of 1928.

Strikes.—Among the important strikes of the year 1927-28 were those of the cotton-textile operatives of New Bedford, the barbers of Manhattan Borough, New York City, collar makers, Troy, N. Y., silk workers in Paterson, N. J., shoe workers of Lynn, Mass., the textile workers of Tennessee and South Carolina, and the street car strike of New Orleans. In the autumn of 1928 the United Mine Workers of America receded from its contention for the maintenance of the Jacksonville scale and gave each district the permission to effect a settlement with the operators of the region. Since that time agreements have been signed in several important fields, including Illinois, Indiana, Iowa, Kansas, Michigan, Montana, Ohio, and Wyoming. The union, however, advises those of its members (numbering thousands, it says) who have secured jobs in other industries to keep them, as the industry is suffering from "progressive stagnation," and no improvement is looked for by the union.

Arbitration has become increasingly in use. The trade groups resorting to this means of settlement included the building, clothing, and mental trades, miners, motion-picture operators, actors, and theatrical employees, and the textile workers. The street-railway unions have been using arbitration for years and, of course, a whole system of mediation and arbitration for railroad employees is provided by the railroad labor act. The hosiery workers have been successful in negotiating a national agreement, one of the provisions of which establishes a system of arbitration and an impartial chairman for the industry.

PROBLEMS OF THE LABOR MOVEMENT

Organization. — The trade-union movement is always confronted with the task of organizing the unorganized workers. The American Federation of Labor includes some 3,000,000, the railroad unions not affiliated with the Federation account for about 490,000, the Amalgamated Clothing Workers for some 150,000, and other unaffiliated unions for about 180,000, a total of considerably less than 4,000,000 workers. Assuming that there are some 25,000,000 wage earners in this country, the enormous field yet to be covered is evident. The iron and steel industry and some of the newer industries, such as automobile manufacturing, automobile repairing, gasoline stations, etc., the southern textile industry, the manufacture of radios, etc., all are as yet almost untouched by organization.

Women's Garment Industry.—Again, even in some of the organized trades, the unions are hard pressed to hold their own. Such a case is that of the women's garment industry of New York City. Dissensions within the union and a disastrous strike called by the left-wing group in control at the time almost wrecked the union and reduced its hold upon the working conditions in the industry to a serious point. Many small non-union shops had sprung up and the industry was in a fair way to revert to a "sweated" condition. To regain control of the industry and to drive out the sweatshops, the union recently undertook a successful strike in the cloak branch of the industry. Important gains were made, and the union plans an intensive and continuing drive against the sweated shops in all branches of the trade.

The textile trades have also faced a difficult situation. The northern organized districts have witnessed an exodus of textile manufacturers to the southern districts where labor organization has been until recently unknown. Some progress has been made in the organization of the Southern workers, and a bitter conflict is in progress there now, but much remains to be done. Intensive organizing campaigns are being carried on by the Amalgamated Clothing Workers in the various men's clothing centers, especially Philadelphia, heretofore a non-union stronghold.

Stability of Employment.—This question in a particular line of work is one which is of vital concern to every laboring man whether union or non-union. Studies by the United States Bureau of Labor Statistics of stability of employment in a number of industries show a low average percentage of full-time employment in some instances. Thus the fertilizer industry offered an average of only 51.1 per cent of full-time work, the automobile industry 80.8 per cent, the men's clothing industry 85.1 per cent, the northern group of cotton mills 85.2 per cent, the pottery industry 88.4 per cent, and the slaughtering and meat-packing industry 89.9 per cent, while good records of 92.8, 93, and 94.2 per cent were made in the paper and pulp, the southern cotton-mill group, and the iron and steel industry.

Many of the factors which lead to irregularity of employment are beyond the control of labor organizations. They have, however, done what they could in this direction and many collective agreements contain clauses whose purpose is the stabilization of employment. Prohibition or restriction of overtime, equal distribution of all work available among the regular work force, working of short time, a guaranty by the employer of a certain period of employment each year or half year, and unemployment insurance are some of the means resorted to in this connection. Some of the unions also are advocating either a shorter working-day or working of fewer days in the week, so as to provide employment for the regular forces; among those advocating this policy being the printers and the railroad brotherhoods.

Labor Displacement.—A most menacing problem is that of the displacement of labor by machinery and by mass production methods. Such inventions as the "printer" in the telegraph industry, the new teletypesetter in the printing industry, the "talkies" in the motion-picture industry, making it possible to dispense with the theater orchestras, present a serious problem to the workers in those industries. Machinery and new methods are also being used to a greater and greater extent in agriculture, displacing the hand workers, and use of the cutting machines and mechanical loaders is becoming more general in coal mines.* More and more product is being turned out, but fewer and fewer workmen are needed to do it. New industries are, of course, being started, but whether and to what extent these are absorbing the workers of those industries with diminishing labor forces is a question.

---

* The research department of the International Brotherhood of Electrical Workers lists the following automatic machines: Televox (the mechanical man), teletypesetter for transmission and composition of news, automatic stoking apparatus on vessels, automatic cigar-making machine, vitaphone, movietone, photophone, automatic telegraph machine ("printer"), superheater, auxiliary engines and automatic stokers on railroad locomotives, automatic telephone switchboards, Iron Chink (fish cleaner), concrete mixing machines, automatic unloading devices for ships and freight cars and trucks, electrified baking machine, electrified mining machinery, automatic ditch digger, automatic refiner in copper industry, automatic machinery in steel mills, electrified oven in coke processing, mechanical glass blower, mechanical cigarette

A study made by the Institute of Economics for the Senate Committee on Education and Labor reached the conclusion that "the newer trades are absorbing a good percentage of the workers who are being discharged from the older industries. Absorption, however, is a relatively slow process." Another problem to be considered in this connection is that of the older worker. Many industries state it to be their policy not to discharge their old employees but to transfer them to lighter work. Although definite data are hard to obtain, it is undoubtedly true that the older men seeking employment are at a decided disadvantage in the present-day demand of industry for speed and high-pressure production. The question of unemployment, due to whatever cause, is one of increasing interest and is to be included in the coming census.

SOCIAL AND PROTECTIVE MEASURES

Benefits.—Some of the larger international unions have built up quite a system of benefits, and almost all of those of any size have benefits of one sort or another. Such benefits include sick and death benefits, tuberculosis benefits or treatment, unemployment benefits, homes for the aged, old-age pensions, etc. During 1928-29 the flint-glass workers established a death benefit plan. The relative merits of insurance underwritten by the individual union and of group insurance taken out with either an old-line insurance company or one of the two labor insurance companies is receiving the consideration of a number of labor organizations. The executive council of the American Federation of Labor reports that benefits paid by its member unions in 1928 amounted to $32,813,925. It is reported that the musicians' local of New Orleans is collecting funds to be used in the erection of a home for the care of sick and disabled members. The question of the establishment of a home for aged and disabled members, and the probable cost thereof was taken up in the recent convention of the hotel and restaurant employees' union. This question as well as the feasibility of establishing an old-age pension was referred to the executive board for further study.

Old-age Pensions.—An old-age pension plan was adopted by the carpenters in their 1928 convention. The potters, in their 1928 convention, appointed a committee to investigate the matter of an old-age pension, getting data as to ages, cost, etc., the report to be made at the next convention. One of the subjects to be taken up in the barbers' convention is that of establishing an old-age pension or a home for aged, or both. The matter of a pension is also being agitated among photo-engravers, lathers, lithographers, plasterers, and painters.

Unemployment Insurance. — The Illinois Federation of Labor has recently been giving publicity to a plan whereby a union finance federation would be formed to write unemployment insurance. In certain industries there is an unemployment insurance system financed either by the employers and workers jointly or by the employers alone. Such plans are in force in the cap-making industry and in the men's clothing industry of Chicago and Rochester. That in Chicago has been in force since 1924, during which time more than four million dollars has been disbursed in benefits. In the 1924 agreement between the Amalgamated Clothing Workers and the men's clothing manufacturers of

---

roller, endless-chain process in automobile production, automatic stamping machine, iron hoister, automatic power control, bread-wrapping machine, automatic vendors, winding telephone cable machine, steam shovels, compressed-air digger, compressed-air riveter, automatic knitting machine, automatic belt in candy manufacturing, automatic check-writing machine, broom-making machine, automatic bottling machine, automatic office machinery, spray-painting machinery, automatic cutting machinery in clothing industry, gyro stabilizer on boats, tide-predicting machine on coast service, thermostatic controls of all kinds, chewing-gum wrapping machine, mechanical cotton picker, automatic shoe welding and building machine, teletype (telephone typewriter).

the New York City market a provision was incorporated calling for unemployment insurance. The union was not strong enough to enforce this provision and it remained inoperative. The same provision was written into the 1928 agreement and was immediately put into force. Under the plan the workers make no contribution but each employer contributes 1½ per cent of the amount of his weekly pay roll. The 1928 season was a bad one and a good many men's clothing workers had considerable unemployment. Not all of these would have been entitled to benefits, nor was the fund yet in a position to start regular payments of benefits. At the suggestion of the union, however, the impartial chairman of the industry agreed to appropriate $25,000 from the fund, to be used to assist the most needy members of the union. Twenty dollars was the maximum paid to any person, and several hundred workers benefited thereby.

There was a joint-contributory system of unemployment insurance in the cloak and suit industry in New York City until the communist-called strike of 1926. Resumption of the system was one of the demands of the International Ladies' Garment Workers' Union in its strike of July, 1929. The terms of settlement of that strike provide for the restoration of the fund as soon as unionization of the industry reaches such a point as to be enforcible upon a substantial part of the employers.

Recreation.—The union printers in 1924 formed a golf league which every year, at the time of the International Typographical Union convention, holds a golf tournament. Their ranks have this year been joined by the photoengravers, with their first tournament. In 1928 the New York bank of the Amalgamated Clothing Workers inaugurated a foreign travel service which, according to the union's official journal, "bids fair to become an important activity of the bank."

Housing.—The only development in this field was the beginning of construction by the Amalgamated Clothing Workers of another (the seventh) block of apartments, which will provide accommodations for some 200 families at an estimated rental of from $9.50 to $11 per room.

LABOR CREDIT UNIONS AND BANKING

Labor credit unions are steadily increasing in number. Some of the labor organizations are encouraging the formation of credit groups among their members. Perhaps the most active in this respect is the Brotherhood of Railway Clerks. Other union groups with one or more credit unions are the carpenters, electrical workers, fur workers, garment workers, headgear workers, lithographers, locomotive firemen and enginemen, machinists, men's clothing workers, painters, railway mail clerks, and teachers. There are some two hundred credit unions among the postal employees, but these are not restricted to members of the union. The labor banking movement has suffered some shrinkage. In 1927 there were 35 such banks. By July, 1929, this number had been reduced to 24. These 24 had a capital of $7,012,000, surplus and undivided profits of $3,823,000, deposits of $93,950,000, and total resources of $110,538,000.

RAILWAY LABOR RESEARCH FOUNDATION

Leaders of several organizations affiliated with the Railway Labor Employees' Department of the American Federation of Labor have recently organized the Railway Labor Research Foundation. The purpose of this new body will be to "conduct scientific investigations and surveys of any plans, programs, policies, and similar undertakings by organized labor in the interest of industrial and human welfare and public benefit, particularly in the railway industry."

CHILD LABOR

By Wiley H. Swift

Acting General Secretary, National Child Labor Committee

NEW LEGISLATION

During 1929 the legislatures of forty-four states were in session. Although a large number of bills relating to child labor and school attendance were introduced, the net gains were comparatively slight and improvement in the condition was negligible.

Illinois.—The educational requirement which children must meet before being granted work permits was raised from the 6th to the 8th grade, with a proviso that vocational instruction may be substituted for academic instruction.

Maryland. — The educational requirement was raised from the completion of the 5th grade to the completion of the elementary course. The School Board in Baltimore has moved that this will operate as a 6th grade requirement in that city. Elsewhere the elementary course includes the 7th grade.

Massachusetts.—A special commission was created by legislative enactment to conduct a study of the general question of increasing the educational requirements for work permits.

Missouri.—The entire child labor law was revised and considerably strengthened with respect to minimum age for work outside of school hours, hours of work, night work, employment in dangerous occupations, educational requirements for work permits, requirement of certificate of physical fitness and issuance of work permits.

Other States.—A Bureau for Women and Children in the State Department of Labor was created in New Jersey. Minor improvements relating chiefly to matters of administration were made in California, Oklahoma, Pennsylvania, Rhode Island and Texas. The length of the school term was increased in Illinois, Maine and Nebraska. Improvement in the compensation law with respect to the basis for determining the amount of compensation awarded minors was made in Idaho and Minnesota.

PROPOSED CONSTITUTIONAL AMENDMENT

Ratification of the Federal Child Labor Amendment was proposed in nine states; Colorado, Connecticut, Kansas, Nebraska, Nevada, New York, Oregon, Utah and Washington. The resolution passed the Senate of Nebraska but not the House. In the other states, the resolution was either defeated or did not come to a vote.

NEW INVESTIGATIONS

Oklahoma.—During 1929 the National Child Labor Committee conducted two studies of child labor in Oklahoma. The first investigation carried on in Oklahoma City, Enid and Lawton, revealed the fact that the primary problem of child labor in those cities was not that children leave school at an early age to go to work, but that a very large number of children, including many under fourteen years, are employed outside of school hours to an extent that cannot but be detrimental to both their physical condition and their school work. The second study, conducted in Tulsa, is now in press.

Connecticut.—The National Child Labor Committee also made public a study of child labor in Norwich and New Britain. This study is one of a series made by the Committee in cooperation with several local Connecticut agencies. The Consumers League of Connecticut has published as another report in this series a study of child labor in Meriden, Middletown, Torrington and Waterbury.

Indian Conditions.—Another significant study which, among other things, revealed appalling conditions of child labor was the Meriam report on conditions among the Indians, made after a seven-month exhaustive investigation by a committee of experts working under the Institute for Government Research.

NATIONAL CHILD LABOR COMMITTEE

Twenty-fifth Anniversary.—The year 1929 marks the twenty-fifth anniversary of the founding of the National Child Labor Committee. Contrasting child labor conditions in 1904 and 1929, the National Child Labor Committee reports that in 1904 only 17 states were attempting to keep children under 14 out of factories; by 1929 each state had some kind of a 14 year age limit and in 39 states no children under 14 can work in factories under any circumstances. In 1904 five states prohibited the employment of children under 16 in factories at night; by 1929 thirty-one other states had followed suit. In 1904 only two states had established an 8 hour day for children under 16 years in factories; by 1929 the number had increased to 36.

Problems of the Future.—In outlining their work for the future, the Committee points out that notwithstanding this progress, many evils of child labor still remain. There are still loopholes whereby children under 14 can work in factories in some states; the 8-hour day for children is not universal; night work, especially outside of factories, is still possible; health and educational standards for entering industry, while in most states far beyond the standards of 1904, in some states have not yet been written into the law, and in others are not enforced. And certain fields of employment still constitute a baffling problem—notably canneries, street trades, tenement home work, and agriculture.

Employment Aspects.—The Committee further calls attention to the importance of further study of new aspects of juvenile employment, including the prevention of industrial accidents to children through prohibiting their employment in dangerous occupations, further reduction of working hours, the establishment of continuation schools and coöperative classes, methods of apprenticeship, the development of vocational guidance and education, health service for employed children, and the rehabilitation of minors injured in industry.

BIBLIOGRAPHY

General.—Federal Children's Bureau has published *Children in Agriculture* and *Child Workers on City Streets.* These are general resumés of child employment in agricultural and street work over a period of years by the Children's Bureau, the National Child Labor Committee and other agencies.

National Child Labor Committee has published the following: *Child Labor Laws and Child Labor Facts,* an analysis by states; *Child Labor,* a series of articles dealing with child labor in its relation to education, health, mental hygiene, recreation, parental education and the standard of living; *Migratory Child Workers,* a reprint of speeches presented at the 25th Annual Conference of the National Child Labor Committee in San Francisco, June 28, 1929; and *The Work of the National Child Labor Committee: 1904 to 1929.* National Consumers' League has published *A Skeleton in Industry's Closet,* youth's compensation for industrial injuries. United States Bureau of Education has published a book on *Laws Relating to Compulsory Education.*

State Reports.—Colorado has issued a report on *Children Working on Farms in Certain Sections of Northern Colorado,* including districts in the vicinity of Windsor, Wellington, Fort Collins, Loveland, Longmont, Colorado Agricultural College; Connecticut, *1358 Child Laborers in Four Manufacturing Cities,* Consumers' League of Connecticut, *Child Workers in Two Connecticut Towns—New Britain and Norwich,* National Child Labor Committee; Massachusetts, *The School and the Working Child,* Massachusetts Child Labor Committee; Mississippi, *Child Labor in Mississippi,* National Child Labor Committee; New Jersey, *Child Labor in New Jersey,* Federal Children's Bureau; Oklahoma, *Child Workers in Oklahoma,* National Child Labor Committee, and Pennsylvania, *A History of Child Labor Legislation in Pennsylvania*, Division of Women and Children, State Department of Labor, and *Migratory Child Workers and School Attendance*, Division of Women and Children, State Department of Labor.

LABOR IN POLITICS

BY LINDLEY D. CLARK

DEPUTY COMMISSIONER, U. S. EMPLOYEES' COMPENSATION COMMISSION

PARTIES AND POLICIES

General.—With the avowed revolutionary position of the Communist and Socialist Labor parties, both championing the overthrow of capitalism, and the latter the establishment of a Dictatorship of the Proletariat, the American Federation of Labor stands in direct contrast. The Socialist Party, less extreme in its pronouncements and proposing to proceed along constitutional lines, is less provocative of attack by those who are in general content with the political *status quo*.

Party Alignments.—Considering the recent success and present popularity of the Labor Party in Great Britain, one wonders whether its policy will not give impetus to movements in the United States along more definite party lines. However, the Executive Council of the American Federation of Labor, in its report to the annual meeting of that body in November, 1928, commends the nonpartisan attitude of that body by saying: "The wisdom of such action is clearly apparent when it is considered that the American Federation of Labor is composed of men and women who entertain different political opinions. They are not required to become identified with or to support any political party when they become members of the American Federation of Labor." So far as available reports indicate, the same attitude was maintained at the convention at Toronto this year, nonpartisan action being indorsed without debate as the order for the campaign of 1930.

Polling Strength.—With a membership ranging about the three million mark, it seems reasonable to assume a voting strength in the family groups represented of perhaps six or seven millions. Yet the total number of votes last year received by the candidates of the labor parties was less than half a million. The Socialist candidate received the bulk of the ballots cast by members of the minor parties, or 267,835. Four years ago this party joined the Progressives in supporting Robert M. LaFollette, who polled nearly five million votes. The vote in 1920 was 919,799. The Workers' (Communist) party polled 48,228 votes as against 36,386 in 1924; while the Socialist-Labor party gave its candidate 21,181 votes as against 36,428 in 1924. The Farmer-Labor party mustered 6,391 votes in an unsuccessful effort to carry on a struggling movement to bring together agricultural and industrial elements, as had been attempted with like failure in 1920 and 1924. The conclusion seems inevitable that the wage-earners of this country are not politically class-conscious, though the most radical of the definite labor groups is the one that actually made extensive gains last year as compared with 1924.

LEGISLATION

Slogans.—Only approval can be given to the sentiment expressed in a slogan of the last campaign put out by the American Federation: "No loyal citizen of our country will vote for other than those candidates who have proved that the interests of all the people are above the selfish demands of the few." Another slogan made more of a class appeal: "No wage-earner should vote for a candidate who has opposed remedial legislation urged by Labor." On its face, this suggests the duty of accepting the judgment of the indorsers of the measures urged.

Bills Proposed.—The outstanding bill may be safely said to be that prohibiting "the abuse of the injunction in labor disputes." Other measures stressed relate to child labor, Filipino and Chinese exclusion, the application of the quota law to Mexico, and in general favoring a strict enforcement of the immigration laws. Any war conscription law involving labor is condemned; while the Convention of 1929 opposed any legislation on the subject of war that might affect the current activities looking toward world peace. What would seem to be a disproportionate amount of attention is given to Federal employees, such as questions of retirement pay, Saturday half-holidays, age of entrance on and retirement from service, speeding-up processes, rates of pay for the lower salaried classes, and other less important issues.

Attitude of Labor.—The general public doubtless approves the irenic and regulative attitude of the Federation leaders, and appreciates their services and those of the Railroad Brotherhoods in doing away with the violence and bitterness of the great strikes of the past and the irritating and wasteful jurisdictional disputes that have so hindered building operations even up to recent years; but the question yet remains whether such a program as is above indicated is one that will continue to command the support of labor. Action practically limited to the defeat of objectionable bills and the promotion of others in state and national legislatures, dealing thus only with fractional areas of the civil government, and like procedure with regard to candidates here and there, has been criticised repeatedly as piecemeal and futile.

CONSIDERATIONS OF POLICY

Trade Union Conference.—That there are dissatisfied members of existing trade unions is apparent from the fact that in May, 1929, a conference of some 150 men and women, nearly five-sixths of whom were affiliated as officers or members with existing trade unions, many of these belonging to the American Federation of Labor, met in New York City and pledged support to "independent labor party action as a substitute for the useless non-partisan policy" of the Federation, since "only through intelligent coöperation expressed on the industrial, political and educational fields can the workers bring in a new society embodying the age-long ideals of all great leaders and teachers—social and industrial justice." This "conference for Progressive Labor Action" may apparently be fairly regarded as a potential ally, if not a direct promoter, of the Socialist Party. What it bodes for the future cannot be predicted. The editor of the *American Federationist,* of course, dissents from its position, and classes it with earlier "groups who thought they knew better than trade-unionists what trade union policies ought to be, and who organized to convert us," and have passed into history with their aim unaccomplished.

Communists in North Carolina.—The confusion and violence connected with the textile disputes of North Carolina have their political implications, but the whole situation has been so badly handled by apparently every intervenor that no benefit can be forecast as accruing to anybody. Apparently courting martyrdom of a sort, the Communists have undoubtedly spread their doctrines to some extent in a new field; but whether the seed sown will take root and grow would seem to be doubtful. American soil and air have not heretofore been favorable to the development of such ideas as have been there promulgated, and even the errors of the opposition cannot be expected to do more than give opportunity for a sporadic growth. As labor's spokesman, the Federation has not gained prestige by any effective procedure; and neither Church nor State has achieved renown in this laboratory in which government and human relations are in process of testing.

LABOR LEGISLATION

By Irene Osgood Andrews

Associate Secretary, American Association for Labor Legislation

WORKMEN'S COMPENSATION

North Carolina.—The new North Carolina law—the first to be enacted in this state—is compulsory as to all public employments. It includes provision for necessary medical care, a limit of 400 weeks and $6,000 for total disability and 300 weeks and $6,000 for partial disability. The law is elective for all private employments in which five or more workers are employed except agriculture and domestic service.

Amendments.—Among the important amendments enacted were the raising, in California, of the weekly maximum for both disability and death to $25; the raising, in Colorado, of the weekly maximum to $14 and the increase in the total amount payable; the basing, in Montana, of compensation on a sliding scale ranging from 50 per cent to 66⅔ per cent of wages with the weekly maximum ranging from $15 to $21; the reënactment of the New Mexico law with extension of the list of hazardous employments and the raising of weekly maximums and minimums, funeral expenses, weekly maximums on death benefits and amount for medical care and reduction of the waiting period and removal of the time limit on medical care; and the extension, in Illinois, of the schedule list and raise in the weekly maximum for disability. Other amendments were adopted by Iowa, Maryland, Michigan, Minnesota, North Dakota, Wisconsin, Indiana and New York. A commission to investigate the compensation law was authorized in Oregon.

OLD AGE AND RETIREMENT LAWS

Pensions.—Four states established old age pension systems: the California law is statewide, provides for a pension not over $1 a day to be granted to qualified applicants 70 years old who are citizens and whose property does not exceed $3,000; the law creates a division in the Department of Social Welfare to supervise measures taken by county or city and county boards of supervisors and providing for payment by the state of half of benefits paid by counties. The Wyoming law is statewide and compulsory—in each county an old age pension board is established to administer the act; applicants who have attained the age of sixty-five, are citizens, have an income not over $360 a year, are eligible to pensions not to exceed $30 a month; funds must be furnished by respective counties from poor funds. In Utah, an optional-county-old-age-pension-system was established authorizing the payment of $25 a month to qualified citizens sixty-five years old and have a yearly income not over $300. The Minnesota law is also optional, qualifications for and amount of pensions being similar to the California provisions; cities, towns and villages must reimburse counties for pensions paid to their residents, provided residence is at least five years. An important amendment to the Wisconsin old age pension law provides that a two-thirds vote of the county elected board be no longer necessary to adopt an old age pension system.

Public Employees.—Thirty states, Hawaii, Alaska and the Federal Government enacted laws relating to retirement of public employees. Fifteen were new acts. One of the most important was the establishment, in Minnesota, of a compulsory state employees' retirement association.

Investigative Commissions. — In New York, an investigation of the condition of the aged and report with proposed legislation was directed. Illinois provided for an investigation of the advisability of establishing a state employees' annuity fund and report to the legislature. In Michigan and North Dakota studies of the Teachers' retirement funds and reports with proposed legislation to the governor were directed.

MOTHERS' AID

Eleven states amended mothers' aid laws, eight of which liberalized existing laws. Arkansas urged Congress to enact the Newton Bill. Nevada repealed the act accepting provisions of the Sheppard-Towner Maternity act. Wisconsin accepted the benefits of any maternity or infancy act offered by the Federal Government, and reënacted, amended or created sections of the Children's Code, liberalizing mothers' aid provisions.

WAGE LEGISLATION

Payments.—Safeguarding the payment of wages was the subject of legislation in twelve states, while mechanics' liens and wage preference laws were enacted in seventeen states and in Hawaii. California required that employers who make wage deductions because of tips given employees must conspicuously post a notice to that effect.

Minimum Wage.—Hawaii and Nevada raised minimum wage rates for unskilled labor on public works. Kansas raised policemen's salaries in certain cities.

HOURS OF LABOR

Public Works.—California extended the eight-hour day to work done for political subdivisions of the state; Montana raised the penalty for violation of the hour law; New Jersey extended the six-day week to municipally paid police departments; Oregon authorized certain exemptions; Wisconsin provided for an investigation of violations and of hours in state charitable and penal institutions.

Private Employment.—As to maximum hours in private employment, California extended the women's hour law and raised the maximum penalty for first violation; Michigan extended its hour law and granted certain exemptions; Montana raised the maximum penalty for violation for underground miners and smeltermen; New Hampshire fixed a day's labor at ten hours; Rhode Island made certain exemptions to women's hour regulations; Wyoming no longer allows necessity to be a ground for employing a female at any time.

Rest periods were granted to certain groups of employees. Leaves of absence to state department employees were granted by Connecticut; Florida and Massachusetts granted vacations to certain public employees; New York allowed, except in cases of emergency one day of rest in seven to policemen; Hawaii shortened vacations for public employees. Maine and Massachusetts made certain exemptions to their Sunday rest-day laws and, in Massachusetts, to the rest-period law; West Virginia raised the fine for Sabbath day labor.

GROUP LIFE INSURANCE

California, Colorado, Iowa, Michigan, New York, Pennsylvania and Wisconsin amended existing laws for the purpose of extending group life insurance to labor unions and subdivisions of the state.

EMPLOYMENT

Employment Agencies.—California included farm labor agencies among definitions of employment agencies and required that notice of refund of fee be inserted in receipt given to applicant and in posted schedule of fees. Provisions requiring, in licensing of agents, citizenship, good moral character, suitability of premises and (or) need for proposed agency, were enacted by Colorado, Iowa, Michigan, Minnesota, North Carolina, Oregon, Pennsylvania and West Virginia. Some of these laws further regulated advertising; keeping of records; raised fines for violation, license fees, and amounts of bonds conditioning compliance with act. In New York, certain registries for nurses were exempted from the law. Texas regulated the business of emigrant employment agents. West Virginia also provided for the maintenance of a state public employment bureau. New York authorized school districts to maintain employment services for children. The Governor of Delaware was authorized to appoint an employment bureau. Indiana raised the state employment commission's appropriation.

Investigation.—Two commissions were created to investigate unemployment. In Porto Rico the commission was directed to survey causes of industrial and agricultural unrest. In Massachusetts the textile industry was the subject of the investigation. The Federal Government provided for inquiries on unemployment in the taking of the decennial census.

SAFETY AND HEALTH

Children and Minors.—California, Illinois, Indiana, Minnesota, Missouri and Nebraska strengthened child labor and (or) continuation school laws. Michigan authorized the employment of minors over 14 in certain occupations during vacations and extended certain occupation exemptions for males between 16 and 18 to females of the same age group. Oklahoma exempted certain children employed in theaters from the child labor law. Pennsylvania repealed certain obsolete child labor laws. Oregon repealed a law requiring children not taught elsewhere to attend schools maintained by the United States. Utah repealed a law relating to school records for employed children and also exempted certain minors from part-time school attendance.

Factories.—Sixteen legislatures provided for further regulation in factories, mines or transportation. California regulated work in air pressure tanks and steam boilers. Pennsylvania reënacted boiler and elevator laws and the strengthening in certain respects of the New Jersey caisson law.

Coal Mines.—Colorado made many changes in the coal mine inspection law, which include that black powder be only used as specified and after all employees are out of the mine. In Oklahoma, sections of the coal mine law applying to lead, zinc and other metal mines were reënacted into a separate law specifying safety measures, requiring boys under sixteen, women and girls be employed only above ground and that an eight-hour day be maintained. The Oklahoma coal mining code was also recodified, with many important changes: rock-dusting may now be substituted for sprinkling or spraying; ventilation requirements, methods of checking men in and out of mine and firing of shots and other provisions are revised and storage, issuance, and distribution of explosives is regulated for the first time; the same hour, women and child labor provisions are provided as in the metal mine law. Amendments in Pennsylvania include provision that rock dust must be used as specified and that approved locked safety or electric lamps be used and inspected in each dangerous part of a mine. Three additional inspectors in West Virginia and the use of only approved safety or electric lamps in certain mines were provided for. The Wyoming law requiring shot firers in coal mines was reënacted. Illinois created a commission to investigate methods and conditions of mining with the state with special reference to safety and conservation.

Safety Orders.—Laws relating to adoption of safety orders were enacted by West Virginia and Ohio. The former law authorizes the commissioner of labor to adopt certain building construction codes promulgated by the American Society of Mechanical Engineers and approved by the Federal Department of Labor. The Ohio law authorizes the public utilities commission to promulgate and enforce all orders relating to the welfare and safety of railroad employees.

COLLECTIVE BARGAINING

Probably the most significant advance is the Wisconsin law making all so-called "yellow dog" contracts null and void, the first law of its kind. In Pennsylvania industrial police were made subject to investigation before appointment and revocation of commissions, and monthly reports were provided for. Nebraska authorized the use of union labels. In Minnesota, notice and hearing in court were made an additional requirement for granting an injunction. Arbitration laws were reënacted in Connecticut and then amended in Oregon.

ADMINISTRATION

Seventeen states increased salaries or appropriations for the administration of labor laws. Kansas created a Commission of Labor and Industry to take over the administration of labor laws heretofore administered by the Public Service Commission—workmen's compensation act, factory and mine inspection, state public employment bureau, women's and children's labor laws. In Nebraska, the Department of Labor, with the assistance of employers, employees and certain other persons, is directed to formulate, adopt, publish and enforce necessary safety codes. New Jersey created a bureau for women and children to study problems connected with their labor. Two more grades were added to grades for inspectors in New York. A civil service commission in each county was created in Oregon and similar commissions were created for certain counties in Texas. In Wisconsin, a bureau of personnel was established to replace the state civil service commission.

EMPLOYMENT

By Sumner H. Slichter

Professor, Cornell University

EFFECT OF THE BUSINESS BOOM

Production and Employment Gain.—The first half of 1929 marked the culmination of the business boom which began about January, 1928. In the successive months of March, April, and May, 1929, the record for industrial production was broken. In May, the Federal Reserve Board's index of industrial production (unadjusted for seasonal variations) stood at 125 against 110 for May, 1928 (monthly average 1923-1925 = 100). As a result of the active state of business, employment during the first half of 1929 was greater than during the same period in 1928. But the gain in employment was far less than in production. Factory employment, according to the index of the U. S. Bureau of Labor Statistics, averaged 5.4 per cent more during the first half of 1929 than during the corresponding period of 1928. And although the ton-miles carried by the railroads in June, 1929 were 9 per cent greater than in June, 1928, there was less than a one per cent increase in the number of railway employees. Furthermore, factory employment, though larger than during the first half of either 1927 or 1928, was distinctly below 1923, 1924, and 1925 when industrial production was about one-fourth below 1929. As for railroad employment, the business boom scarcely sufficed to halt the decline which has been going on more or less continuously since 1920.

Construction Industry.—Unfortunately adequate data on employment in other important branches of industry, such as wholesaling, retailing, hotels, public utilities, mining, or construction are not available. In the case of building construction, the boom had already passed its peak before the beginning of 1929. During the first half of 1929, contracts awarded were 12 per cent below the same period in 1928. But because building construction takes time, changes in the volume of employment in the building trades lag behind changes in contract awards. As indicated by the percentage of unemployment among union building tradesmen, employment in the construction industry was greater during the first half of 1929 than during the corresponding period of 1928. For the first six months of 1929, the building trades unions reported an average monthly unemployment rate of twenty-four per cent as against a rate of thirty-two per cent for the first half of 1928.

INCREASES IN EMPLOYMENT

The gains in employment were naturally much greater in some industries than in others. The most noteworthy increases between May, 1928, and May, 1929, were:

	Per Cent
Iron and steel	6.5
Foundry and machine shop products	17.2
Machine tools	33.4
Petroleum refining	15.2
Automobiles	16.9
Agricultural implements	23.1
Electrical machinery and supplies	31.0
Automobile tires	15.0
Shipbuilding	31.5

EFFECT OF THE RECESSION

The business boom apparently reached its peak in May, 1929. Since that time, industrial production has been slowly declining. Between May and September it dropped 5 per cent. Factory employment, after falling below the May peak for three months, increased in September to a new high for the year—99.3 as against 99.2 in May (monthly average, 1926 = 100). Railroad employment, which is normally greatest in the summer, was nearly 2 per cent higher in July than in May and one per cent above July, 1928. Employment in the building trades likewise continued above 1928. For the three months, June, July, and August, the percentage of unemployment among union building tradesmen averaged 18 as against 22 in the same period of 1928. But in view of the recession in physical production, it is probable that the trend of employment will be downward for several months—probably until the end of the year or longer. On the other hand, the fact that stocks of manufactured goods are not large and that commodity prices have not been inflated, makes a severe drop in factory employment unlikely.

INTEREST RATES AND EMPLOYMENT

Surprise has occasionally been expressed that the high interest rates which prevailed during most of 1929 did not apparently diminish employment. For this there are several reasons. Profits of business enterprises were large. The profits of 236 industrials during the first six months of 1929 were $892,000,000 against $670,000,000 during the same period in 1928. Furthermore, the high prices of common stocks enabled corporations to obtain funds at exceedingly low rates through security flotations. For example, the average yield of 50 industrial stocks in July, 1929, was 3.27 per cent against 4.11 in July, 1928. Finally, although bank credit was expensive, it was available in the necessary quantities to most enterprises.

TREND OF FACTORY EMPLOYMENT

Between 1919 and 1925, the number of factory employees in the United States diminished by 640,000, despite the fact that factory output increased by 25 per cent. The figures for the 1927 biennial census of manufactures, released on February 28, 1929, show a drop of only 28,200 between 1925 and 1927. This raises the question of whether the downward trend of factory employment may not be nearing the end. Between 1920 and 1925 the hourly earnings of factory workers fell only 8 per cent. The prices of producers' goods (that is, goods used in the making of other goods) fell 38 per cent. Furthermore, long time interest rates dropped about 16 per cent. Under these circumstances, it was profitable for manufacturers to use a larger proportion of capital and a smaller proportion of labor in production and this is precisely what they did. But after five years of substituting capital for labor, the opportunities for reducing costs in this way became less numerous. It would not be surprising, therefore, if the smallness of the decrease in factory employment between 1925 and 1927 foreshadows the end of the decrease in factory workers.

STATISTICS OF EMPLOYMENT

Improvements.—The serious deficiencies in the employment statistics in the United States are slowly being reduced. During the last year, the U. S. Bureau of Labor Statistics began the collection of figures on employment in coal mining, metalliferous mining, public utilities, wholesale and retail trade, hotels, and canning and preserving. From these data it will be possible to construct series showing the changes in employment for identical plants. Congress has authorized an inquiry into unemployment as a part of the 1930 census of population. The volume of unemployment in the United States has been the subject of much conjecture and dispute. Although figures which indicate the amount of unemployment on only one date leave much to be desired in contrast to a continuous index of unemployment, the census figures will be valuable as a basis for making future estimates of unemployment.

LABOR MEDIATION, STRIKES AND LOCKOUTS

By Ethelbert Stewart

Commissioner of Labor Statistics, Department of Labor

RAILROAD LABOR MEDIATION

Disputes.—The United States Board of Mediation was constituted under the terms of the Railroad Labor Act of 1926, to handle cases of dispute which the carriers and employees have been unable to settle in conference. When disputes between carriers and their employees can not be settled through mediation proceedings, the law directs that the Board of Mediation shall endeavor to induce the parties to submit their controversy to arbitration. In case all these efforts fail, and the Board of Mediation believes the controversy may result in serious interruption of interstate commerce, the President of the United States may appoint an emergency board to make investigation and report to the President. There is, however, nothing savoring of compulsory arbitration in the act. Thus far, three emergency boards have been appointed by the President.

Adjustments. — During the two years ended June 30, 1928, the Board of Mediation received 363 requests for its services in the adjustment of differences concerning rates of pay, rules, or working conditions, involving 63 railroad organizations and 384 carriers. Of these 363 cases submitted to the Board, 256 cases were disposed of by June 30, 1928, 141 being settled through mediation agreement, 41 being submitted to arbitration, 52 by mediation withdrawal, 17 by voluntary withdrawal, and 5 by Board action. Of the 107 cases remaining unsettled, 58 had been assigned for mediation, and 49 cases had not been accepted for mediation.

Perhaps the most important and far reaching arbitration settlement since June, 1928, was the award on January 18, 1929, of an increase of 40 cents per day to the shop employees of the New York Central Railroad. This award was followed by like increases to shop employees on many other railroads through direct negotiations between representatives of the employees and the managements of the carriers. Railroad telegraphers on four railroads were awarded increases of from one cent to 3½ cents per hour per position. Railway clerks on four railroads were awarded increases of from 2 cents to 3¾ cents per hour. In one case where the carrier had requested a decrease and the railway clerks had requested an increase in rate of wages, the arbitrators refused to make any change in the wage rate. Railroad signalmen, train dispatchers, yardmen, and railway clerks received increases through the services of the United States Board of Mediation without recourse to arbitration. Three boards of arbitration were reconvened by request of the employees for the purpose of interpreting their awards.

Emergency Boards.—The first emergency board was appointed April 28, 1928, by the President, to investigate and report upon a dispute between the Kansas City, Mexico & Orient Railway System and its train and yard service employees. The findings of the board were, in brief, that the financial condition of the carrier would not permit the increase requested by the employees, and that the employees should accept the increase offered by the carrier.

The second emergency board was appointed by the President, Sept. 29, 1928, to investigate the wage dispute between 47 western railroads and their conductors and trainmen. The report of the Board suggested that the following proposals be submitted to the vote of the employees and that the carriers abide by the result: 6½ per cent increase without change in rules; or, 7½ per cent increase and the elimination of the double header and tonnage limitation rules. The trainmen accepted the 6½ per cent increase without change in rules.

The third emergency board was appointed by the President on March 29, 1929, to investigate a dispute between the Texas & Pacific Railroad and its conductors, trainmen, engineers, and firemen. The most important of the four questions before the board was the compensation of employees who suffered financial loss by reason of being compelled to vacate homes owned by them in Longview and Marshall, Tex., through the removal of the terminals to Mineola, Tex., and Shreveport, La. The Board found that the loss should be borne equally by the carrier and the employees, and recommended that the claims should be settled in conference or, in case of a disagreement, by arbitration.

CONCILIATION SERVICE

Federal.—The work of the Conciliation Service of the United States Department of Labor is that of mediation in labor disputes. It has been the general policy to respond promptly to any calls for the good offices of the representatives of the Conciliation Service from either employers, employees, or from the public affected by any individual dispute. In handling of trade disputes representatives of the service coöperate freely with state or local agencies or committees. The preliminary figures for the fiscal year ending June 30, 1929, show conciliators were assigned to about 600 industrial disputes. More than one-half of these disputes were settled by the commissioners. A number of the disputes were settled without the assistance of the commissioners.

State.—The Industrial Commission of Colorado, created in 1915, is charged with certain duties as to arbitration and mediation. One of the most important decisions of the past year was in the case of coal miners in the lignite fields of Boulder and Weld Counties of Colorado and the operators of the Centennial Mine. The decision of the commission granted the miners the right of collective bargaining, and the same scale of wages and working conditions as those now in effect and being paid by the Rocky Mountain Fuel Company which are specified in a 2-year agreement between that company and the United Mine Workers of America.

INDUSTRIAL ARBITRATION

The Printing Unions.—Among various printing unions arbitration as a method of settling disputes with their employers has been long established. A number of such disputes were settled by local arbitration boards during the past year. In the case of the typographical unions of Butte and Anaconda, Montana, the local board granted an increase of $3.50 per week, retroactive to July 1, 1927, and fixed the duration of the contract for three years, beginning July 1, 1927. The publishers appealed from the decision of the local board. The International Board of American Newspaper Publishers Association and the International Typographical Union, with Prof. Paul H. Douglas of the University of Chicago, as chairman, affirmed the award of the local board.

Street Railways.—Disputes between street railway companies and their employees in three cities were referred to arbitration boards. The Public Service Commission of the State of Indiana sitting as a board of arbitration in the matter of a petition by the employees of the Indianapolis Street Railway Company, under date of May 24, 1929, denied the petitioners' request for an increase in wages. The Public Service Commission of Missouri acting as a board of arbitration in the wage controversy between the Amalgamated Association of Street and Electric Railway Employees and the Public Service Company of St. Louis, awarded motormen and conductors an increase of 2 cents an hour, and bus operators 4 cents an hour. All repair shop, storeroom and general shop employees who had been working 54 hours per week were placed as near as practicable on a 48-hour week basis in lieu of an increase in wages. A board of arbitration awarded the street railway employees of the Memphis Street Railway Co., of Memphis, Tenn., a small increase. Operators of two-man cars were given an increase of 1½ cents an hour, and one-man car operators an additional one-half cent an hour.

STRIKES AND LOCKOUTS

Clothing Workers, New York.—The strike was called for July 2 by the International Ladies' Garment Workers' Union against the inside manufacturers, members of the Industrial Council of Cloak, Suit, and Skirt Manufacturers, Inc., the so-called stylists of the industry, and against the contractors, members of the American Cloak and Suit Manufacturers' Association, Inc. A third group, the jobbers, members of the Merchants Ladies' Garment Association, Inc., was also involved. The union demands included a $5 wage increase, reestablishment of the unemployment insurance fund, a 40-hour week, and modification of reorganization rights affecting discharge. The main purpose of the union in calling a strike, however, was to strengthen its control of the industry and to do away with the alleged sweatshop.

A virtual settlement of the major differences was reached on July 11 between representatives of the union and of the Industrial Council, the other two associations accepting similar settlements. The employers' demands respecting piecework and a 42-hour week were dropped. The employers also agreed to a substantial modification of the reorganization or discharge clause, whereby the discharging of shop chairmen or other union workers will be subject to review by the impartial chairmen. The union withdrew its demand for a $5 increase in the minimum scale, but the agreement provides that one year from the date thereof the union may apply to the impartial chairman to consider a modification of the wage schedules therein agreed to. Agreement was reached to organize a joint control commission to supervise the maintenance of standards and agreements and to discourage the manufacture of garments in non-union shops. The commission is to be maintained by annual contributions from parties to the agreement, which runs for three years, ending June 1, 1932. After receiving the approval of the shop chairmen and of the union membership in a referendum vote on July 15, the agreements were formally signed at the city hall in the presence of the lieutenant governor and the mayor on July 16, on which date the workers began to return to their places of employment.

Shoe Workers, Lynn, Mass.—This strike in Lynn, involving approximately 2,000 workers and some 49 plants, began February 28 to enforce demands, including a new agreement, wage increases, and union recognition, the strikers being members of what is known as the independent unions. About two-thirds of the strikers, according to press reports, resumed work March 4, after the unions had signed agreements with the manufacturers. The strike was virtually ended by March 7, but a complete settlement was not reported until March 14, when all of the 49 shops were operating on normal schedules. The unions waived their demand for a 20 per cent increase in prices and agreed to draw up a new price list and to submit it to the manufacturers.

Rayon Workers, Tennessee.—The American Glanzstoff Corporation was affected by a strike of employees in its plant at Elizabethton beginning the middle of April because of alleged discrimination of the company against members of the newly formed textile union. The strike, it is said, also involved the near-by plant of the American Bemberg Corporation under the same management, and came as a sequel of an earlier strike of 800 employees of the American Glanzstoff Corporation in March, which began as a protest against low wages, but developed into a fight for union recognition also. The earlier strike ended March 22, following an agreement providing that the wage scale for men at the Glanzstoff plant will be the same as that prevailing at the Bemberg plant prior to March 18, which was an average increase, it was said, of about 20 per cent. The scale for women employees was also represented as an increase. Employees were to resume work under the open-shop plan, but without discrimination against members of the newly formed union. On May 24 the strike came to an official end.

Building Trades, Missouri.—The strike began May 1 in St. Louis, interfering more or less seriously with building operations in that city. Approximately 4200 workmen were originally involved, exclusive of 120 stonecutters, who, it is understood, returned to work on May 24 under the old wage scale. The iron workers, of which there were about 700 involved, demanded an increase from $1.50 to $1.75 an hour. The building laborers numbering some 3300, constituted the main group of strikers. Their old scale, it is said, ranged from 75 cents to 92½ cents an hour, and a flat rate of 90 cents an hour was demanded. About 200 plumbers' helpers demanded an increase from $7.50 to $8. A compromise was effected on June 12 of $7.75 per day immediately and of $8 after July 31. The laborers agreed on June 8 to resume work on a flat scale of 87½ cents an hour effective August 1. The ironworkers ratified a compromise agreement on June 21 which provides for payment beginning June 24 of a wage of $13 per 8-hour day until May 1, 1930, when they will receive $14. The agreement runs for two years.

Structural-Iron Workers, Illinois.—Demanding a wage increase of $1 per day approximately 2200 iron workers in Chicago, members of bridge and structural iron workers' Local No. 1, conducted a successful strike from June 1 to June 6. A compromise proposal of the employers for a wage scale of $1.56¼ an hour to October 1 and $1.62½ thereafter until May 31, 1934, was rejected on June 4. A partial settlement of the strike occurred on the night of June 4 when one group of employers, the Chicago Steel Erectors' Association, granted the workers' demand. The agreement is to remain in force until June 1, 1930.

Shoe Workers, Haverhill, Mass.—Demanding a wage increase of 10 per cent and a five-day week of 44 hours, the Shoe Workers' Protective Union inaugurated a strike at Haverhill, beginning June 1, with 280 employees of the Milchen Shoe Co. This number had, through accessions from time to time, increased by June 27, to approximately 5000 strikers, affecting about 26 factories, according to press reports. The strikers rejected, on June 7, a proposal by the association for an agreement continuing the present wage scale and hours of labor and containing a provision that there shall be no strikes, lockouts, or cessation of work, and that all disputes be submitted to an arbitration board of three members. This proposal was made on condition that the strikers return to work immediately. The strike ended August 19. Under the plans of the settlement, the wages and hours of labor in effect when the former agreement expired are to continue for three years with the privilege of extending it to December 31, 1934, if both groups agree.

Street-Car Workers, New Orleans.—Approximately 1500 motormen, conductors, pitmen, and helpers of the Amalgamated Association of Street and Electric Railway Employees of America, members of the carmen's local union in New Orleans, began a strike on July 1 against the New Orleans Public Service Inc. for "wage increase and signed union agreement." The attempt of the company to operate the cars with outside operators on July 5 was attended by considerable disorder and rioting.

Following the alleged burning of many street cars early July 6, steps were taken to stop the violence. Federal Judge Borah on July 9 granted a preliminary injunction against the union street-car men, restraining them from rioting, from damaging the company's property, and from interfering with the operation of the street cars. On July 9 the union made known to the company through the city commission its willingness to send the men back to work if the company would immediately recognize the union and arrange for negotiations for a new working contract. The union abandoned its demand for the arbitration of all discipline and dismissals of the men and agreed to allow the company full protection of its rights in the operation of street cars. The company rejected the offer. Various plans to settle the strike through mediation met with failure.

Cotton Workers, North and South Carolina.—A number of strikes occurred in the cotton textile mills beginning at Ware Shoals, South Carolina, March 15. Most of these strikes were in South Carolina and presented a protest against an alleged new efficiency system, variously described as the Bedeaux system, stretch-out system, stretch-over system, minute system, etc. The more important of these strikes involved the following companies in South Carolina: Ware Shoals Manufacturing Co.; Pelzer Manufacturing Co.; Brandon Mills and Poinsett Mills at Greenville, and Woodruff Cotton Mills at Woodruff; Issaqueena Mill at Central; Monarch Mills at Union; Union-Buffalo Mills Co., at Union; Ottaray Mills at Union; Anderson Cotton Mills at Anderson; Mills Cotton Mill No. 1, at Greenville. The companies involved in North Carolina were the Loray Cotton Mill at Gastonia; Florence Mill at Forest City, and the Marion Manufacturing Company at Marion.

WORKMEN'S COMPENSATION AND INSURANCE

By John B. Andrews

Secretary, American Association for Labor Legislation

LEGISLATION

General.—During 1929, Congress and the legislatures of forty-four states, two territories and two insular possessions held regular sessions which, in several instances, were supplemented by special sessions. An unusual volume of legislation was enacted in the field of workmen's compensation, 39 legislative bodies having acted on this subject. Progress was also made in old age pension legislation, notably in California, Minnesota, Utah and Wyoming, and group insurance was authorized in a number of states. Most significant in workmen's compensation legislation was the adoption of a reasonably adequate law in North Carolina, thus leaving only Arkansas, Florida, Mississippi and South Carolina without this modern protection against industrial accidents. Carefully considered proposals were defeated after a strenuous fight in Arkansas and Florida where workmen's compensation was a leading issue, and Arkansas enacted a compensation law to cover state highway employees. In Mississippi and South Carolina, which meet in legislative session in 1930, increasing public interest in the subject indicates that a concerted effort will be made to secure enactment when the legislatures convene in January. Alaska, Indiana, Maine and New Mexico reënacted their compensation laws, and outstanding amendments were adopted in California, Colorado, Illinois and Montana.

North Carolina.—Following preliminary discussions, public hearings and numerous conferences of representative groups directly affected, agreement was reached on a bill which was enacted into law with a few changes. The act is compulsory as to all public employments and elective as to all private employments in which five or more workers are employed except agriculture and domestic service. Among specific exclusions are railway workers, convicts, and persons selling agricultural products. Important provisions include a seven day waiting period, ten weeks' medical care subject to extension by the commission, a 60% wage scale, an $18 weekly maximum and a $6 minimum, with a limit of 400 weeks and $6,000 for total disability and 300 weeks and $6,000 for partial disability and, for specified injuries according to schedule, 350 weeks and $6,000 for death. If no dependents survive, the commuted value of the full death benefit less burial expenses is paid to the personal representative of the deceased. The act is administered by a commission of three full-time members. Recent official reports indicate that 18,000 employers are operating under the law and that an average of 126 reportable accidents occur daily.

State Laws Amended.—In addition to the amendments adopted in the seven states listed separately below, important changes in other jurisdictions were made. Iowa raised the medical allowance and strengthened requirements for the securing of compensation. Maryland extended the list of hazardous employments and improved accident prevention features. Michigan improved the provision requiring double compensation to illegally employed minors. Minnesota removed the ninety-day limit on medical care. North Dakota raised the burial allowance and Ohio extended the occupational disease schedule. Oregon authorized the appointment of a committee of nine to investigate the compensation law. Wisconsin perfected certain procedural and administrative provisions and Wyoming extended the list of hazardous employments, made disfigurement compensable and increased death benefits to parents.

California.—The most important improvement made in the California law was the raising of the weekly maximum to $25 for both disability and death, the highest provided in any state (in New York the $25 maximum applies only to total disability). The Federal Longshoremen's Act which last year was extended to apply to private employees in the District of Columbia provides the same maximum as that fixed in California. The monthly maximum in the Federal law for civilian employees of the government is $116.66. Other improvements included the further safeguarding of insurance requirements and extending the second injury provision.

Colorado.—Limits on medical care were raised from 60 days and $200 to 4 months and $500. The weekly maximum was raised from $12 to $14 and the total amount payable was also increased.

Illinois.—The weekly maximum for disability was raised from $14 to $15 in case of an employee without children and from $19 to $20 if the employee has four or more children. The schedule list was extended and insurance provisions strengthened.

Indiana.—In reënacting the law, increased compensation was provided for certain disabilities. Minors illegally employed are excluded by implication.

Montana.—The compensation law was vastly improved through the adoption of a number of important amendments. Provision was made for more adequate medical care and the waiting period was reduced from 14 to 7 days but only if the employee has dependents. Compensation is now based on a sliding scale ranging from 50 per cent to 66⅔ per cent of wages with the weekly maximum ranging from $15 to $21.

New Mexico.—The list of hazardous employments was extended. The weekly maximum and minimum for total disability was raised from $12 to $15, and from $6 to $8 respectively, payments to extend for 550 instead of 520 weeks. Funeral expenses were raised from $75 to $125. The weekly maximum on death benefits was increased to $14. The waiting period was reduced from 10 to 7 days. The time limit on medical care was removed and the amount was raised from $150 to $350. The court system of administration, however, was retained in this revised law. With only seven exceptions state laws are administered by a commission demonstrated to be essential to the successful operation of the compensation system. A number of states have abandoned the court method when investigation showed its inadequacy. Kansas is the most recent state to substitute commission for court administration and the new North Carolina act provides for a full-time commission of three members. The three Federal laws are likewise administered by a commission.

New York.—The occupational disease schedule was extended to include four new groups although the Industrial Survey Commission recommended eleven additions. The failure of the legislature to carry out even the recommendation of its commission demonstrates again that adequate occupational disease coverage will not be secured until the all-inclusive method is adopted. A bill providing this much needed protection, in accordance with the recommendations of the Governor and Industrial Commission and numerous labor and social welfare organizations, was not even reported out of committee. Separate schedule awards to run consecutively are now permitted in case of the loss of more than one member. The coverage sections were amended in certain particulars and foreign insurance companies are now required to file a bond as security for payment of compensation on policies for risks located in New York State.

VOCATIONAL REHABILITATION

Connecticut, Maryland and Texas accepted the provisions of the Federal vocational rehabilitation act, the state board of education in each case being directed to coöperate with the Federal board. Congress also accepted the act for the District of Columbia where the United States Public Health Service is directed to coöperate with the Federal board. There now remain only four states—Delaware, Kansas, Vermont and Washington—that have failed to enter into the coöperative educational plan for vocational retraining of their cripples. Although Missouri and New Hampshire have already accepted the act, neither state has appropriation for carrying on the work.

OLD AGE PENSIONS

New Laws.—New old age pension laws were enacted in California, Minnesota, Utah and Wyoming. Ten states and one territory have thus adopted the principle, previous statutes having been enacted in Alaska, Colorado, Kentucky, Maryland, Montana, Nevada and Wisconsin. It is possible that New York, with its official inquiry by a state legislative commission, will adopt this plan during the coming legislative session.

California.—Provision is made through a statewide law for the payment of a pension—which when added to other income shall not exceed $1 per day—to qualified applicants who have attained the age of 70 years and whose property does not exceed $3000. A division of state aid is created in the Department of Social Welfare to pass upon measures taken by county or city and county boards of supervisors. These boards are to act upon applications for aid, provide funds and perform all other necessary local administrative duties. Claims for aid are to be presented to the state by respective counties and city and counties, and when approved by designated state authorities, a sum equal to one-half the total amount of payments made will be paid by the state to the county.

Minnesota.—The optional county plan was adopted in this state. Pensions must not exceed, when added to other income, $1 per day. Applicants whose property does not exceed $3000 must, in addition to other requirements, be at least 70 years of age. Application must be made to the district judge in the county of residence who is to make necessary investigation, fix the amount of the pension and administer the law. Each county board must annually appropriate a sum sufficient to carry out the provisions of the law, each city, town and village to reimburse the county for payments to persons who have been residents for five years or more.

Utah.—The Utah law is also optional; monthly pensions may not exceed $25 and may be paid to qualified applicants 65 years of age who in addition to other requirements have an annual income of less than $300. Boards of county commissioners are empowered to provide county funds to carry out the law.

Wyoming.—The compulsory Wyoming law establishes in each county an old age pension board to administer the act and make necessary rules and regulations. A qualified person who has attained the age of 65 and whose annual income does not exceed $360 is eligible to a pension which will not exceed $30 per month. Funds for the pension payments and administration shall be furnished by the respective counties from poor funds but the yearly expenditure may not exceed the equivalent of the amount represented by ¼ mill on the total assessed valuation of property within a county.

COGNATE SOCIETIES

AMERICAN ASSN. FOR LABOR LEGISLATION, 131 E. 23rd St., New York City.

AMERICAN FEDERATION OF LABOR, A. F. of L. Bldg., Washington, D. C.

AMERICAN FEDERATION OF MUSICIANS, 1440 Broadway, New York City.

INDUSTRIAL WORKERS OF THE WORLD, 90 E. 10th Street, New York City, New York.

INTERNATIONAL ASSN. OF GARMENT MFRS., 395 Broadway, New York City.

INTERNATIONAL ASSN. OF MACHINISTS, 799 Broadway, New York City.

INTERNATIONAL LONGSHOREMEN'S ASSN., 500 W. 30th St., New York City.

INTERNATIONAL SEAMEN'S UNION OF AMERICA, 623 So. Wabash Ave., Chicago, Ill.

JUNIOR ORDER OF UNITED AMERICAN MECHANICS, 121 No. Broad St., Phila., Pa.

LABOR DEFENCE COUNCIL, 108 E. 14th St., New York City.

LEAGUE FOR INDUSTRIAL DEMOCRACY, 70 Fifth Ave., New York City.

MARINE ENGINEERS' ASSN., 119 Broad St., New York City.

MASTERS', MATES' AND PILOTS' ASSN., 119 Broad St., New York City.

NATIONAL ASSN. OF LETTER CARRIERS, A. F. of L. Bldg., Washington, D. C.

NATIONAL CIVIC FEDERATION, 1 Madison Ave., New York City.

NATIONAL FEDERATION OF POST OFFICE CLERKS, American Fed. of L. Bldg., Washington, D. C.

NATIONAL INDUSTRIAL CONFERENCE BOARD, 247 Park Ave., New York City.

NATIONAL INDUSTRIAL COUNCIL, 11 West 42nd St., New York City.

NEPTUNE ASSN. OF MASTERS AND MATES OF OCEAN AND COASTWISE STEAM VESSELS, INC., 82 Broad St., N. Y. C.

DIVISION XVII

RELIGION AND RELIGIOUS ORGANIZATIONS

INTERDENOMINATIONAL ACTIVITIES

By H. K. Carroll

General Statistician of the Churches

UNION OF PRESBYTERIAN CHURCHES IN SCOTLAND

Significance and Scope.—A change of vast importance in the history of the Reformation in Scotland took place in the present year. It concerns the oldest and largest of the Reformed bodies in Scotia, known popularly as the "Kirk," or the "Auld Kirk" of Scotland, with which the great name of Knox was so closely connected in the days of its development, and which has held the relation of an established church to the state of Great Britain until a few years ago. It also brings into union with itself the descendant of the Free Church created in the disruption of 1843 and led by Thomas Chalmers and other great leaders in calling men to repentance. The union brings them together, to the content of the State, the two Churches which fought each other in the hot discussions of the Disruption, giving to Scotland a homogeneous organization, under the Westminster standards of doctrine, with a modernized interpretation and a government and discipline one and the same. The consequent increase of unity represented by the new Church of Scotland is without a parallel in the history of the Presbyterian or any other Christian Communion. The Free Church comes back to the relations it severed in 1843, as nearly complete as it went out, with change of name to the United Free Church, but with no less of spiritual power or ecclesiastical effectiveness, the only change consisting of its access of fellowship with the old organization from which it broke away. The United body declared in its basis of union, with the utmost clarity, its reception of the Westminster Standards and the sense in which it accepts them in these modern times, also its devotion to and reverence for the Bible as *containing* the word of God.

Relationship with the State.—Its articles concerning the State are most gracious in spirit, withholding no whit in recognition of the power and duty of the Royal Government, while assuming for itself no obligation to any other power than that of Christ the Head of the Church in spiritual leadership and control, though it ventures to remind the State that it, too, has obligations to the Divine Head of all created things. The Church's self-release from both the Parliament and the Courts, referring to the bonds of the State and the procedure of the courts in the laws relating to private patronage and civil matters, is both clear and firm. A few quotations from the declarations of the Church indicate how felicitously worded its declarations are: "This Church receives . . . from the Divine Head of the Church and from Him alone the power to adjudicate finally in all matters of doctrine, worship, government and discipline in the Church, including the right to determine all questions concerning membership and office in the Church, the constitution and membership of its courts and the mode and election of its office-bearers." This is the clear wording of its appreciation and understanding of its liberty, and it adds, to make its statements still more definitive, that the recognition by the State of these rights of the Church, "does not in any way affect the character of them or give the civil authority any right of interference." The Church, alluding to the representatives of the Crown who have hitherto been accustomed to come to the Assembly as dignitaries with power, says we will still be glad to receive them with royal honor, adding, however, that they are "not constituent members of the Assembly." As President Henry Sloane Coffin, of the New York Union Theological Seminary, says: "This is the happy solution of a Church at liberty in her own house and in cordial comradeship with the State."

Meeting of the Assembly of the Reunited Church was in October last. Lord Davidson, former Archbishop of Canterbury, a representative of the companion Reformed Church, the Church of England, was there to present his greetings and to say the influence of the great event there taking place would be felt far and wide. The assemblies of the two uniting churches first met separately in their own places in Edinburgh, marched in two processions to a fixed point and then together to St. Giles' Cathedral where a service of thanksgiving with an impressive ceremonial was held. Delegates from almost everybody in Britain and beyond attended. Here the Presbyterian breach of 86 years was healed. It was recalled that Robert Louis Stevenson said many years ago, speaking of the nearness of the Scottish Churches to each other, "There is but a street between them in space, a shadow between them in principle." The resolution for union was put and unanimously carried. The moderator then made announcement: "In the presence of Jesus Christ, the King and Head of the Church, I declare the Act of Union to have been finally adopted, and that the Church of Scotland and the United Free Church of Scotland, each in fidelity to its great heritage, are now become one Church in Christ Jesus, under the designation of the Church of Scotland."

United Membership. — The two uniting bodies have in membership: Church of Scotland, 762,774, United Free Church, 534,950, total 1,297,724. Other bodies are the Free Church—"Wee Frees," Reformed Presbyterian and the United Original Secession, all quite small.

UNION OF CONGREGATIONAL AND CHRISTIAN CHURCHES

In October, 1929, two separate denominations, the Congregational and Christian, were happily merged at Piqua, O., where the General Convention of the Christian Church was in session. These two bodies were widely different in origin and name and in some other particulars, but came together without a jar. The Congregationalists began in this country with a shipload of immigrants from Holland, landing at Plymouth Rock in 1620, one of the oldest denominations in this country. The Christian Church, dating from early in the Eighteenth Century united in organization three small bodies, one led by O'Kelley out of Methodism, known as Republican Methodists, another coming from a Baptist named Elias Smith and a third from a Presbyterian revival in Kentucky. These two merging denominations are the first not of the same name or form of belief or practical system to come together in the United States, and their action is likely to lead to other mergings, particularly as there are a number pending. There are steps yet to be taken to make the union of the two complete. They state that they find in the Bible the supreme rule of faith and life, but finding there is room for differences of interpretation they condition union on the acceptance of Christianity as primarily a way of life and not uniformity of theological opinion or practice of ordinances. One of the further mergers considered is that of publications. It is already agreed to unite the *Herald of Gospel Liberty*, and *The Congregationalist*, both among the older of religious papers; with other changes to be made in Sunday School and other publications. This denominational merger follows one made a few years ago by which a small body known as the Evangelical Protestant Church, formerly German, were united, and advances have been made between the Congregationalists and the Universalists, and possibly with the Unitarians also. The total of the new merger is possibly upward of 1,050,000.

PROPOSALS FOR OTHER UNIONS

Methodists, Presbyterians and Episcopalians.—Action was taken in 1928 by the Protestant Episcopal General Convention, the Methodist Episcopal General Conferences, North and South, and the Presbyterian General Assemblies, North and South, for a joint commission to consider three questions which the late Bishop Brent, head of the Faith and Order movement of 1927, thought it would be profitable to discuss with a view of ascertaining: 1—How far do moral and social questions cause the present divisions? 2—What authority has the Church in such matters? 3—What is its proper function? The Commissions met in New York, excepting that of the Southern Methodist Church not yet named, and organized under the presidency of Bishop Parsons of California and created an executive committee for the consideration of the subject. Probably it will require no little time to reach a conclusion.

The Reformed Church.—Three other bodies, the Reformed Church in the United States (German), the Evangelical Synod of North America, and the United Brethren in Christ, resolved to consider the question of union, and met separately and reached conclusions. The Reformed Church is a member of the family known as the "Alliance of the Reformed Churches Throughout the World Holding the Presbyterian System." It appears that the Reformed Church met representatives of Presbyterian Churches incidentally in Baltimore after the latter had taken up the matter of the union of the several Presbyterian bodies, thirteen in number, but it was not thought that this latter movement need interfere with the former. The Synod of the Reformed Church has taken action on the proposed union with the two bodies mentioned above. And approves, with the suggestion that there are some differences in the case of the United Brethren in Christ, but that it was largely organized originally in Pennsylvania where the Reformed element was prevalent and must have received many of them among its converts. Questions were raised, it appeared, about the relation of the Synod of North America to the question of Prohibition, and some were of the opinion that consummation ought not to be pushed until it was settled that all were ready for it. *The Evangelical,* the organ of the latter Synod, explains that its people are not for the saloon and believe in obeying the law of enforcement. The United Brethren commissioners discussed the question of union fully and frankly and voted to meet with the commissions of the other two bodies. By a unanimous vote the Commission declared its desire to reach union with the other commissions, if no preventing reason were brought out in the joint meeting yet to be held. The three Churches would make a body of more than a million members.

United Brethren in Christ.—The progress of the movement for the Union of these Brethren in Christ Churches, has been most remarkable. Dec. 12 the three commissions held a joint meeting in Dayton, Ohio, and statements in behalf of each were presented and discussed and a vote was taken which resulted in unanimous approval. Immediately thereafter the commission of the United Brethren was reassembled and decided that their Board of Bishops should prepare a resolution covering the whole question of union with the other two bodies to be submitted to their annual conferences for consideration, to be followed by a meeting of the commission to canvass the expressions made by the conferences and reach a final decision, which it is believed will be for union of the three bodies. Thus after the most careful consideration ever given to such a proposal, this happy result is looked forward to as the last step in the plan for the creation of a United Church of nearly a million and a half of communicants to be known as "The United Church of America."

The Northern Baptists and the Disciples of Christ, of somewhat different belief and practice, adopted resolutions at their separate sessions held in 1929, looking to closer relations.

The Friends met together for the first time in a conference in Oskaloosa, Ia., to discuss questions looking to a better understanding. There are four titles applied to as many different groups, viz., Orthodox, Conservative, Progressive and Wilburite, which are near enough in belief and practice to constitute one body, called Orthodox generally; a Liberal body known as "Hicksite," and one called Primitive, having only one congregation also exist. The conference enjoyed no little freedom in its discussion and was pleased that its fellowship took such pleasant lines.

Presbyterians and Methodists.—The Methodist General Conference and the Presbyterian General Assembly agreed in 1928 to appoint commissions on union and these commissions had a session in Pittsburgh in 1929 enjoying a delightful fellowship, although the groups have had pending proposals of union among themselves; the Methodists, between the oldest and largest branch, the Methodist Episcopal and the Southern branch, the Methodist Episcopal South, whose General Conference, meeting in Dallas, Texas, in May, 1930, may take up the matter again at that time. The Presbyterian Church in the U. S. is talking of Union with the Reformed Church in America, and at a recent meeting of representatives of various branches in Penn-Mar, Penn., a resolution was adopted proposing that the whole body, including the two Reformed Churches, should endeavor to come together.

Conference of Christian Unity League.—The Christian Unity League is a body of Christians of various denominations, formed as a voluntary movement for the promotion of Christian unity among Protestants. It held a meeting in New York City in the autumn of 1929, which gave rise to no little discussion concerning a proposal to hold a communion service in St. George's Protestant Episcopal Church, to be conducted by a Presbyterian minister, Rev. Dr. Henry Sloane Coffin, President of the Union Theological Seminary in New York. Then the announcement was made by Dr. Reiland, the rector, that he and his vestry had agreed that there was no canon known to them to prevent them from turning over the Church property for such a purpose. Bishop Manning intervened with the declaration that he could not permit such action as it would be contrary to the canonical law of the Protestant Episcopal Church. Whereupon Dr. Reiland informed Dr. Coffin that his views were not changed by Bishop Manning's statement, but he did not feel that he could act contrary to the prohibition. A correspondence in which both Episcopal and non-Episcopal ministers participated, became quite sharp. Similar proposals for a communion service in an Episcopal Church by a minister not ordained by a bishop in the apostolic succession have been made, extending back to the time of Dr. Stephen H. Tyng, but heretofore they have been prevented. At a meeting of the Executive Committee of the Protestant Episcopal Church League it was voted to ask the next Episcopal General Convention to repeal or modify the canon invoked by Bishop Manning.

Message of the Christian Unity League.—The League of which Rev. Dr. Peter Ainslie, a minister of the Disciples of Christ, is President, issued a statement at the close of its conference, addressed to Christians in all Churches, in which it was said that attempts to base unity upon any beliefs held in common had always led and must always lead to division and controversy. The right way, it insisted, lies in the direction of graver coöperative endeavor between all Christian groups in an effort to extend the Kingdom of God in local communities and throughout the world. To this end it proposed interchange of pulpits by ministers of different communions, reception of members from one communion by another, union of congregations by different denominations; union of separate groups within different bodies, looking to the union of the whole church; union of missions, education and other work in coöperative agencies. A continuation committee was appointed to promote these purposes.

FEDERAL COUNCIL OF CHURCHES OF CHRIST IN AMERICA

Program. — This great body of Christian Churches reached the beginning of the twenty-first year of its existence in the first week in December, 1929. The Council never had a more busy year in carrying on its constantly widening work in the United States, Europe and elsewhere than in 1929 and its interests in 1930 will be still larger. Its program, as set forth for next year in part, includes many of the coöperative plans of Protestantism such as the Home Missions Council and Council of Women for Home Missions, Federation of Women's Boards of Foreign Missions, Conference of Foreign Missions and Cure of War, World's Committee of Y. M. C. A. in Geneva, Switzerland, North American Home Missions Congress, etc. There are 29 Churches holding relations with the Federal Council, which report an aggregate of nearly 22,000,000 members. Bishop Francis J. McConnell, of the New York Methodist area, is President of the Council, succeeding Dr. S. Parkes Cadman. At the meeting of the Executive Committee at Chicago in December the question was raised as to whether the Council might be asked and authorized to take up more work of a coöperative character for the various Churches than it now conducts. Further consideration of this matter will probably require attention.

Nineteen Hundred Years of the Church of Christ.—The Pentecostal Anniversary indicating the nineteen hundredth year of the Christian Church is to be given universal celebration in 1930 in all the accessible parts of the world. The Federal Council is to have this great service under its attention, having prepared and published an extensive program for its celebration. The leadership is in the care of the Commission on Evangelism and Life Service of which Rev. Dr. Charles Goodell, is Chairman. Pentecost, meaning fifty, signifies to all Christians the descent of the Holy Ghost, upon the disciples and others gathered in the "upper room," in Jerusalem, at the time of the Jewish Passover, signifying to some Jewish people the gift of the law, and to others the departure of Israel from Egypt. It falls on June 8 when there was a great revival as the Holy Ghost fell on those gathered in the "upper room." The program issued by the Federal Council proposes the beginning of special parish work, looking to ingathering of converts, on Oct. 6, 1929, and extending to January, 1930, and called the preparatory period: a second period extends from Jan. 1 to Easter and from Easter, April 20, to Pentecost, June 8. It is suggested that during the ten days extending from Easter, a series of "upper room" union prayer meetings be held in churches, homes, shops and stores in every community throughout the country. This period is to be used as an ingathering time in addition to Easter.

MIGRATION OF NEGROES TO NEW YORK CITY

Churches. — The migration of Negroes from the South which began several years ago, due to loss of civil rights and economic oppression, brought many of the race to Chicago, New York and other cities, where their civil, social and family conditions have been greatly improved. In Harlem there is a single square mile of 200,000 Negroes, a larger number than are to be found in any space of similar extent in the world. They have secured by their own exertions and by the help of white associations some fine large churches which they crowd to the doors and in the construction of some of which a quarter million dollars have been expended. As to housing, some are crowded into poor tenements, but others are so fortunate as to find homes in the fine houses of which Stanford White was the architect. Abyssinian Baptist Church cost $300,000 of which nine-tenths was subscribed by its own members. This church collects without exertion $1,000 every Sunday by the envelope system. There was a mortgage on it but last year it was paid and evidence of debt was burned. St. Mark's Methodist Church, belonging to the New

York Methodist Conference, also has a church, beautiful in architecture. These and other colored churches have Negroes as preachers.

Schools.—The school facilities for the children are also superior to those which they had in the South, and the Teachers' College of Columbia University is in coöperation in training work, and artistic instruction is given to young and ambitious artists. Colored singers delight audiences with spiritual songs, like "Swing Low Sweet Chariot" and the race that many regard as inferior in parts of the South approach a condition of equality in treatment that delights them. The Federal Council of the Churches of Christ, together with the Methodist City Missionary Society and other religious bodies seem ever ready to hold out a helping hand.

WORLD ALLIANCE FOR INTERNATIONAL FRIENDSHIP

This is a new movement launched a short time ago. It is to operate through the Churches and Good Will Congress. It is composed of thirty-nine national bodies. In the fall of the present year the World Alliance held a conference in Nashville, Tenn., and discussed various aspects of the peace movement and proposed the removal of the most persistent irritants to international friendship. Cultivation of Christian fellowships and friendships, it is believed, will abrogate war, the most vicious and destructive influence operating among the nations. Representatives of different countries and races were present. The Briand-Kellogg Peace Pact furnished lessons for many of the speakers to draw for the near and distant future, and grounds for the hopes expressed. In connection with this spirited meeting the Federal Council of the Churches of Christ in America brought forward at Chicago in the December meeting of its Executive Committee a proposal that a World Church Union be formed, with Geneva as its center. The Federal Council proposes a Commission on Relations with Churches Abroad by consolidating its Committee on Relations with Europe, its Committee on Relations with the Orthodox Oriental Churches and with the American Section of the Continuation Committee of the Universal Christian Conference on Life and Work. By action taken at Chicago, the Federal Council is to proceed to secure such approval from the denominational bodies as is needed to regularize this action. The Continuation Committee on which various countries are represented has met annually, the most distinguished members serving in turn as its President. At the first meeting of the Universal Christian Conference at Stockholm, where from forty-four different countries representatives attended, there were 610 from 103 denominations numbering more than 345,000,000 Christians. It will be seen, therefore, that the Christian world is gathering itself together for herculean efforts in behalf of Christian fellowship, friendship and peace.

PROGRESS IN FOREIGN MISSION WORK

All the Churches of the United States are changing more or less their plan of missionary operation in the great fields of Asia and Africa, Europe and Mexico and South America, yielding more and more of responsibility of operation and management to the native Christians. The American Board, the oldest of American boards, representing the Congregationalist denomination, has led all societies in placing the entire responsibility and control of its Chinese work and property in Chinese hands. Dr. Cheng is general Secretary of the National Christian Council of China and Moderator of the Church of Christ in China, which includes nearly all missionary societies. What the American Board has already done is for North China and it declares this to be its policy for all its other missions in China. It will be recalled that the General Conference of the Methodist Episcopal Church last year submitted to its annual conferences constitutional amendments allowing Central Conferences in China, India and other foreign mission fields to elect bishops for the administration of each of these respective territories. Favorable voting upon these proposals leaves little or no doubt that the amendments will be adopted, which will give autonomy to these fields and in the end instead of being one body there will be a number of bodies each enjoying autonomous power.

LATIN AMERICAN EVANGELICAL CONGRESS

Attendance.—The past year the missions carried on by various Protestant bodies have held a conference or congress in Havana, covering the last ten days in June. Delegates were present from fourteen different nations, and a number of Protestant Missionaries attended as spectators. A Cuban committee made preparations for it and sent out invitations, and Latin ministers and members carried on the proceedings which were of high interest to those who looked on as well as those who took part.

Discussion.—The congress divided itself into companies to consider such subjects as: greater unity, education, indigenous races, ministerial training, medical work, evangelism, schools and women's work. In the evenings there were popular meetings in the different churches and popular addresses, one of the subjects being, "How the Churches Might Face Public Problems." Tithing was recommended but only by a small majority. The interest of many present was so great in the movement of the Congress of the United States to increase the tariff, that the congress broke over the rules, not to bring in politics, and the English-speaking delegates passed a resolution protesting against the lifting of the rates without a careful consideration of its economic effect, which the states had been urging upon the people. While there were differences among those present on religious questions, yet everybody saw that the things which united the delegates were far more important than the things which divided them.

International Federation of Latin-American Churches.—The outcome of the conferences in Havana, in Montevideo and other places, is to be the result of the desire bred for closer relations and larger fellowship. It will include Central and South America and West Indian peoples and will be modeled on the Federal Council of the Churches of Christ in America.

PROTESTANT UNITY IN THE PHILIPPINES

The Protestant Churches which began Christian work in the Philippines are merging themselves, as the General Assembly of the United Evangelical Church, just closed, witnesses. It is the consummation of a movement which the Christian leaders among the nations and the missionaries have long looked forward to. All believe it will, sooner or later, result in the union of all the Evangelical Churches. The Congregational, Presbyterian and United Brethren bodies are already in it, and others are expected to join it. The Filipinos are noted for their devotion and are ready to move as rapidly as the missionaries will approve. The laymen make good speakers, resembling in boldness and freedom of utterance the early Methodists who followed Francis Asbury in America. Work is being carried on among the Igorots and the Ifugas, Bontoc and Klinga, in four different centers. Opportunities await the Church in Mindanao and Moros.

UNION OF CHURCHES IN SOUTH INDIA

Lucknow Meeting.—Union of various Christian Churches engaged in missionary activities in South India, begun several years ago, seems to be growing in spirit and extent. In April, 1929, there was a meeting in Lucknow attended by representatives of Australian Methodists and Churches of Christ, Baptists, Churches of the Brethren, Disciples of Christ, Methodist Episcopal Church, United Church of Northern India, Wesleyan Methodist and of the Society for the Propagation of the Gospel and by an unofficial visitor for Metropolitan India. All essential steps to union were freely discussed in a spirit of good will and a continuation committee was appointed to take practical measures to make known as widely as possible what was said and done and to create a feeling of interest in Church polity; the first to be taken up was the agreement that Congregationalism would not be acceptable in India.

Church Polity.—After debate it was determined that some form of polity giving a measure of congregational liberty so far as consistent with the larger good of the Church, that central authority might be secured by the Presbyterian system and that some measure of supervision might be secured by superintendents or bishops under constitutional control. On the sacraments it was deemed necessary to recognize a definite profession of faith by every member and the place of the child. As to international relationship, it was agreed that the Church must have autonomy and also a degree of fellowship with Churches outside its own territory. As to creed, all agreed that a simple form was desirable which should be quite brief and not such as would impose a test upon ministers.

Area and Christian Population.—The area of the territory represented in this movement is about one eighth of the whole of India, with a population of about sixty million. The natives are very simple people, not of a high intellectual caste but easily approachable and docile. The census of 1921 shows that the Christians are established in about one-third of the communities of India. The rate of increase in the ten years ending in 1921 was about as follows: Christians, 150%; Moslems, 37%; Zoroastrians, 20%; total population, 24%.

THE INFLUENCE OF CHRISTIANITY IN AFRICA

A missionary on the Belgian Congo takes up the story of change going on in Central Africa where it was begun in THE AMERICAN YEAR BOOK last year and shows how the missionaries are introducing civilization where not so many years ago cannibalism and degraded living were holding sway. "Mud huts," he says, "are doomed, and church schools are making centers for communities where profound ignorance dwelt." In Katanga province where they only began to clear forests for houses this year they have a town of 3,500 white men, women, and children with 15,000 natives working in mines. In older parts of Africa the women used to do the heavy out-door work. Often you would find the women in the fields and the men at home. Now it is changed completely, and women are often idle. Now, those interested in them get gardens for them to work and raise their living and greatly improve their diet. Rules of bathing and sanitation have been established for the natives by their employers, and conditions are greatly improved. The airplane now takes the place of the slow and inefficient boat and does now in three days what the canoes required, twenty-five years ago, three months to do. The introduction of industry is helping the Churches to lead the natives to live more cleanly lives, and climb into a more intelligent atmosphere.

JAPAN DEVELOPING AN ELECTRIC SPIRIT IN RELIGION

A Christian missionary discovers a wide religious feeling developing in Japan. The people are taking to Christianity in a marvelous way, even those who have not altogether given up Confucianism, Shintoism or Buddhism. For example they take their babies to a Shinto shrine, then from there at three to five years old to Christian kindergartens, teach them Confucian ethics and bury them with Buddhistic rites. The kindergarten either is under Christian conduct or has a Christian teacher. The seventy years of Christian evangelism puts a Christian imprint upon the people. It is not a Christian missionary who prints in a Japanese newspaper a dramatization of the life of Christ, and note the respect given to a movie representation of the King of Kings. Note, also, how thousands flock to a missionary pointing out the necessity of eliminating the social evil. More than this, Buddhist Sunday Schools are coming into existence and put their own words to Christian hymns, and Christian teachers are welcomed in the schools. Moreover, Toyohiko Kagawa, a Christian prophet, fills halls with his evangelistic addresses and charges admission to gain support for his settlement work; and members of the Imperial Government, including the Imperial household, contribute liberally to the budgets of Christian institutions. A few years ago a none too popular government sought to put all religions under the control of law; but a popular outcry killed the attempt, though it would not have harmed Buddhism or Shintoism.

When General Booth of the Salvation Army made his last movement to Japan his meetings were thronged. Kawaga enjoys the confidence of millions of Japanese and enjoys greater freedom from police interference because everybody knows that in case of trouble he could be counted on as an ally of the Government. A Movement for A Million Souls for Christ was proposed late last year, taken up by Kawaga, who laid aside his own plans, and already, before the plan is fully launched, it has won ten thousand souls as a beginning. It is called in Japanese the "Kamino Kuni," "Kingdom of God," movement. "Doubtless," a missionary says, "Christianity has been too timid for the people to respond as readily as could be hoped to the brave spirit of Kawaga."

CHURCH AND GOVERNMENT RELATIONS

By H. K. Carroll

General Statistician of the Churches

PALESTINE

Conflict Involving Faiths and Races.—Palestine has been called the "Holy Land" since prophets of the Jewish race and Apostles of Christian faith have dwelt there and in the surrounding territory long enough to make such a title seem appropriate. But in 1929 it suddenly became a place of conflict, beginning in Jerusalem itself where Christian, Jewish and Arab faiths had been kept in order formerly by Germany and, since the World War, by the British mandate. In the middle of the year the world was startled with reports of serious clashes, mainly between the Arab and Jewish elements in which many of the latter were killed and not a few injured. Since then reports, protests, statements have multiplied, trying to explain that the blame was entirely due to the outbreak of the Arab followers of Mahomet or, on the other side, to the Jews or to the Zionist party of the latter. Trials have been held by courts or commissions, and prisoners have been sentenced to death or imprisonment; but of all the books, pamphlets, articles and statements issued, none have seemed to find a satisfactory middle road or acceptable explanation. The Wailing Wall in Jerusalem, which seemed to become suddenly a subject of disagreement, has been, in a long history, a place sacred to Jews who wished to give expression to their mournful regret that Solomon's Temple, the glory of their race, was destroyed. The Jews were charged with departing from recent practice in setting up screens to separate the sexes while practicing an ancient rite. When fear and hatred have subsided doubtless a competent examination will clear up the mystery and show that lack of sense and reason create impossible situations, particularly where religion is concerned in an outbreak. There seems to be a rift between the Zionists and the other Jews, and the Arabs object, it is said, to the attempt of the latter to make Palestine a home land for those of their name and aims.

Sources of the Trouble.—Sherwood Eddy, after a careful examination of the source of the trouble, finds what is called the Balfour promise that the Jews shall have in Palestine a national home for the Jewish people, to be in disagreement, apparently, with that made prior to the Balfour promise of 1917 by the High Commissioner of Egypt, on behalf of the British Government in 1915 to King Hassein, assuring the Arabs of the independence of the Arab states, including Palestine. Mr. Eddy thinks the only cure for the trouble is a new interpretation by which a constitutional government shall be created, under which the Arabs, who number some 80 per cent of the population, shall be granted commensurate political power, with adequate safeguards for the creation of a spiritual and cultural home for the Jews; that is, give political control to the Arabs and religious liberty to the Jews.

MEXICO

The past year has brought to Mexico a measure of peace under the administration of President Portes Gil, who succeeded President Calles. An election in November resulted peacefully in the choice of Pascual Ortiz Rubio, notwithstanding the fact that he was the candidate of the Revolutionary Party, so called. He was elected by an overwhelming vote of 1,825,732, nearly all the votes cast, except 125,000. No disturbances occurred in connection with the campaign or voting. The President-elect paid a visit to the United States, spending some time in New York City, and was courteously received, making a good impression. While he was still here ex-President Calles returned from a visit abroad and was well received. The new administration began Feb. 5, 1930, with the promise of continued peace so much to be desired by both Church and State.

TURKEY

Really Church and State in Turkey are separate. There has been no Caliph for years and the head of the State no longer lives in Constantinople, but in Angora. The Moslem priests, or hojas, are now required to have government licenses before taking charge of mosques. All the theological seminaries have been closed except the one connected with the National University, so that it is difficult for young men to fit themselves for acceptance as priests. Moreover, the fez has been forbidden, and Dean Vrooman of the International College in Smyrna says this forced change "has done more to change the mentality of the Turk and make him consider himself an occidental than any other reform." Western customs, such as sports, music, the movies and press unite in giving to the Moslem lively ideas of Western civilization. Transportation facilities in the shape of good roads, railroads, a merchant marine and other modern things are in evidence.

EGYPT

It is worth while to jot down an item of news from Cairo to show that modernism, while strong in the new civilization of Europe and America, is springing up where the centuries have mounted into the thousands. The College of El Azhar in Cairo was founded by a descendant of Fatima or Ali, in A. D. 950 and is the leading college of the world for students whose studies are in the Koran and in the preparation in theology for Ulemas or ministers. The new head announces a change of curriculum, which is to add modern science and modern languages. A new rector, Sheikh Meraghi, has announced the new studies to which will be added the new chairs. This is one of the many signs, added to that of changes in Turkey, showing that Islam is not standing still but is moving along with the revolutions of the world.

PROTESTANT DENOMINATIONAL ACTIVITIES

By H. K. Carroll

General Statistician of the Churches

THE ANGLICAN COMMUNION

House of Bishops Meeting.—The first meeting of the House of Bishops of the Protestant Episcopal Church in 1929 was held in Atlantic City in October. An event of interest was the announcement by Presiding Bishop Murray of the coming into use of the new Prayer Book Sunday, Dec. 1. Soon after Bishop Murray died suddenly and was widely mourned by a sorrowful Church. Bishop Charles P. Anderson, of Chicago, was chosen his successor.

Bishop Manning and Church Discipline.—The act of Bishop Manning in forbidding the proposed use of St. George's Protestant Episcopal Church for a communion service to be performed by a minister not episcopally ordained, led the Protestant Episcopal Church League to call his attention to the violation of the rubrics against reservation of unconsumed bread and wine and the violation of ordination vows in other respects and to request him to give notice of like inhibition in such cases also. Bishop Manning, in a sermon on the revised Prayer Book, said its "liturgical treasures are drawn from the whole spiritual experience of the Catholic Church on earth" and that it involves no change in doctrine, but is the Church's book of doctrine, life and worship.

Meeting of Continuation Committee.—This body, appointed to continue the work of the World Conference of the Faith and Order Movement at Lausanne, Switzerland, in 1927, held its annual meeting in August, 1929, in Majola, Engadine, Switzerland. A memorial service for Bishop Brent was held. Members of most of the communions represented paid tributes to the worth of that leader of the movement. Archbishop Temple of York was elected to succeed Bishop Brent as President. A Theological Committee, of which the English Bishop of Gloucester is chairman, was appointed.

The English Book of Prayer.—The action of Parliament in twice refusing in 1928 to approve the Revised Book leaves the Church nevertheless to the general use of it. There are some who want the matter settled, chief among whom is the Bishop of Durham, who is willing to face disestablishment if necessary. The two houses of convocation advise the continuance of the use of the new book. The Archbishop of York has issued instructions to the ministers and churches of his province. He says the Book has neither statutory nor canonical sanction, but it has been recommended by the bishops for use, and accordingly the Archbishop asks that all deviations disallowed by the Book shall cease. He advises that in accordance with the action of the bishops concerning permitted changes, requiring that the good-will of the parties concerned shall be observed, he will insist that these suggestions be followed. A proposal that the Church Assembly ask for the appointment of a commission to inquire into the present constitutional position of the church was discouraged by high influences and it was believed it would not be pressed.

Call for World Session of Lambeth Council.—The sixth meeting of the Anglican Bishops of the world has been called by the Archbishop of Canterbury to meet at Lambeth Palace, July 5, 1930. This body which issued many years ago the famous Quadrilateral, setting forth the four chief conditions of Christian Unity from the Anglican point of view, speaks through the bishops of all countries for the Communion. It is indicated that important pending problems will be discussed, such as the changes required by the discoveries of science, keener study of the Bible, industrial conditions, the place of women in the Church, Christian Unity, world peace. Between 250 and 300 bishops will be gathered for this Congress from Great Britain, Ireland, Wales, Canada, Australia, New Zealand, South Africa, South America, India and the United States. Under the general topic the "Faith and Witness of the Church of this Generation," these sub-divisions will be considered, (1) "The Christian Doctrine of God"; (2) "Evangelization"; (3) "The Life and Witness of the Christian Community"; (4) "The Unity of the Church"; (5) "The Ministry."

The Catholic Movement.—This party continues if not increases its activities in the Anglican Communion, both in Great Britain and the United States. It has been announced that a central office is to be established and a full-time Secretary is to be employed in this country. The purpose is to coordinate and unite Catholic activity throughout the Church. In this, the course marked out in England is to be followed, where success has been reached by the "piety, learning and devotion of the pioneers" and their "adventurous enthusiasm." The Catholic center in London is in touch, it is said, with the Catholic activity throughout the world. It appears that much attention is to be paid here to the instruction of children in Catholic education, the establishment of Catholic matins, for example. The Cowley Fathers, a Catholic organization known as the Society of St. John, the Evangelist, which observe the monastic rule, are planning a monastery for erection at Cambridge, Mass.

THE BAPTIST COMMUNION

World Conference. — This body, which has churches, pastors, members, Sunday Schools, in all the continents of the world, most of course in America,—8,563,955—with Europe as second,—1,637,000—held its fifth World Conference in Toronto, last year, where reports from many countries were presented with enthusiasm. These world gatherings take place every fifth year. The net gain in members in the last four years was 673,000.

Sectional Conventions.—There are four large conventions in the United States, the Northern, the Southern and the National (colored) consisting of two divisions. They hold annual sessions and conduct their work separately, rendering three separate reports in the *American Baptist Year Book*, published in Philadelphia. The National Convention, whose proceedings are not reported, and which consists of two bodies, is credited with a membership in 1927-8 of 3,515,542. The Southern Convention returned 3,823,660 in 1928, indicating a net gain of 58,659.

The Northern Convention met in Denver, June 14-19, about 2,000 representatives being present. Arthur M. Harris, President in 1928, spoke on "Doors Open—Doors Closed," a topic which led to a discussion as to the use to be made of the younger element. He appealed for a wider opening of doors to "our young people for representation and service on all our church and denominational boards." The speaker appointed to "sound the keynote,"—President Shaw of Denison University—said "the Master looked upon all organized human life as the object of human life. We are to disciple all nations which, He held, means something more than the conversion of individuals. If all the heathen were converted to-morrow and they were no more Christian than are we, this world would still be far from our conception of a Christian world." Bishop McConnell, Methodist, had been invited to express his mind clearly, which he is in the habit of doing. He paid to the Baptists the tribute of having made a long, successful endeavor for liberty of expression, and spoke of our common peril as to be found in the materialistic, secularistic spirit of these times." Much business relating to the Boards of Foreign and Home Missions, to education and other lines of work passed through the Convention. Near the end came a report from the committee on relations with other denominations, recommending that steps be taken to insure closer coöperation with the Disciples of Christ, with a view to ultimate union. The Convention, because of the suddenness of the proposal, offered a substitute motion that the committee be enlarged and continued, and that the subject be brought up at the next convention.

The Southern Convention.—This is a larger body than the Northern, and is indeed the largest religious white body in the South. A year ago it had to report a heavy loss through the defalcations of an officer of the Home Mission Board amounting to $909,000. The boards by careful economy in expenditures during the year removed much of the gloom with which numerous representatives approached the sessions. Obligations and debts had been reduced to the extent of $820,000, and the Convention felt it was on safe ground. It was particularly pleased with the administration of the Board of Home Missions and refused to dismiss it, as had been suggested, or to unite it with the Foreign Board, and adopted a budget system to guard the future of all the boards. The question of women's rights was raised by a protest against hearing the president, Mrs. Cox; but the convention rejected it on the ground that women are members of the Convention, that the Convention is not a church and that in Christ there is neither male nor female.

CONGREGATIONAL CHRISTIAN COMMUNION

The happy merging of the Congregational and Christian Churches in 1929 was the largest union that has taken place since that of three large Lutheran bodies ten years or more ago. The Christian Church, as its history is now recalled, was a united body almost from its beginning in the last century. James O'Kelley, a friend of Bishop Asbury, with some of whose Methodist principles he did not agree, left to take his own course and started a body of Republican Methodists, and these with some converts of a Presbyterian revival in Kentucky, refusing to be called by any except a Biblical name, took the word Christian. The merger brought together these early mergers with that of the oldest of all, the Congregational, which has dated from the arrival of the *Mayflower* at Plymouth Rock in 1620. The Christians brought with them, perhaps, the oldest religious paper, dating from 1808, known as the *Herald of Religious Liberty*, published in Dayton, Ohio. This is to be united with *The Congregationalist,* itself one of the oldest religious papers. The united papers, which will date from March 1, 1930, will have the longest name, perhaps, of any of the organs of the religious bodies of the United States,—*The Congregationalist and Herald of Gospel Liberty*, and its general organization will be called the "General Council of the Congregational and Christian Churches."

The Work of the Union.—The Moderator of the United Church is Fred Smith, who was elected as such at the last meeting of the Congregational Council. The chief work of the merged bodies for the next few years will be the union of missionary, educational, publicational, Sunday School and other boards. There may be in the next few years consideration of the coming together of the new United Church and others like the Universalist and Unitarian Churches, which are among those called liberal in their belief.

The Congregational Churches of the world, include those in the United States, Canada (merged with the United Christian Church), Great Britain, Australia and in the form of missions, carried on by the American Board of Commissioners for Foreign Missions, dating from the first decade of last century, in many foreign lands in Europe, Asia, Africa, Mexico, and Central and South America. These widely separated bodies make up one of the six Protestant Communions, which have world organization with the possibility of at least one more soon,—the Disciples of Christ.

Eliot's Bible.—In connection with the Congregational Communion it is announced that what has been known as *Eliot's Bible*, dating from 1661, has been discovered in Exeter Cathedral, England. It is a battered old Testament, translated by John Eliot, an apostle to the Indians in New England and left in the language in which he wrote it for the redmen. The language has not only been lost, but no one has known how to turn it into English. As a matter of fact the name of the language is not mentioned in the article on John Eliot in the Schaff-Herzog *Encyclopedœdia of Religious Knowledge.* Again and again the reference is no more definite than that of the Indians. There were Pequots and Mohicans or Mohegans, all belonging to the Algonquin stock. Now that the Indian Bible has been found some scholar will be able to tell us what tribe it was printed for.

THE DISCIPLES OF CHRIST

Proposed Union.—There are really two bodies bearing this name, one which has an International Convention, Disciples or Christian, the other, conservative, known as the Churches of Christ, with a convention called the American Christian Convention which met this year at Canton, Ohio. The International Christian Convention, which met at Seattle, appointed a Harmony Committee, which visited the Convention at Canton, Ohio, and reported in favor of the healing of the differences between these two conventions and to heal all other divisional movements and plan a general union, at the International Convention next year, June 8, 1930, at Washington, D. C., to the end that the whole brotherhood may be one Pentecostal Convention. A second idea is to join in promoting the proposed pension plan for ministers and laymen, to help the various missionary, benevolent, and educational agencies of the Communion, and to impress the importance of urging upon all people the evangelistic opportunity offered by the 1900th anniversary of the Pentecost in the Upper Room in Jerusalem. In connection with this movement the cornerstone of a National Christian Church was laid in Washington, D. C., in December which is to cost $1,750.000.

Approval of Union with Baptists.—At the Seattle Convention a report was presented by the Association for the Promotion of Unity concerning closer fellowship with the Northern Baptists. There were twelve recommendations, all approved, and it was declared that the two denominations are alike in their faith, forms of organization, practice of baptism and educational work, and, with the spirit of their people coming more and more into agreement, it is natural and inevitable that the churches should grow in good will and coöperation. "The historic principles of the two denominations have been identical," it was added, "and their conceptions of the nature and functions of the ordinances have gradually approximated one another until they have become at the present time practically the same." In conclusion it was said: "It is our judgment that there are no differences in doctrine, polity or practice between the two communions sufficient to prevent full coöperation and unity of program." Among the recommendations were the increase of fraternal messengers, unity between bodies engaged in foreign mission work, the doing away with overlapping and waste between churches of the two bodies, and the holding of joint conferences on evangelism, education, and young people's work.

Cleavage Between the Two Bodies of the Disciples.—The American Christian Convention represents churches which have been opposed to instrumental music in the churches and to missionary enterprises. Whether this line of separation can be bridged is a matter which will evidently have to be worked out. The smaller body has not grown very rapidly, but has gained about 116,000 in the last ten years. As to the questions of baptism and close communion the practices among the Disciples have grown in freedom more than those among the Baptists. The former, however, are more ready to coöperate with other denominations, perhaps, than the Baptists, particularly the Southern Baptists.

THE SOCIETY OF FRIENDS

A conference of the several bodies of Friends in this country was held in Oskaloosa, Iowa. The *Friends' Intelligence*, of Philadelphia, representing the Liberal, or Hicksite branch, heads its report in simplicity, "All the Friends' Conference," indicating that all the branches, with representatives also from England, Ireland, France, Germany, Japan, Australia and other countries, were included. Not a few questions were discussed, quietly and in a unique way characteristic of the Quakers, a name they seem rather to like. Many speakers referred to the divisions among them, not at all numerous, but so far as they are applied to party not very sharply defined. The word Orthodox is an old designation but around it have gathered others such as Conservative and Progressive. The Wilburites are a small body, but they are quite conservative. Another very small body is called Primitive; it is confined to a single congregation. It is evident that Quakers are willing to live in small companies. It was said repeatedly, "If we would only go back to Christ as the central figure all nonessentials would disappear." Mrs. Yerkes, editor of the *Intelligence*, in a letter to the writer says: "If we are to have branches of Friends there should be a new alignment, for each group contains extreme conservatives and extreme radicals.

THE LUTHERAN COMMUNION

The Second World Convention.—It will be recalled that the first World Convention of the Lutheran Communion, which the war made necessary, was held in Eisenach, Germany, in 1923, and was a great success. In 1929 a second World Convention of the Communion was held in Copenhagen, Denmark. The United Lutheran Church of America organized in 1918, gathered round its headquarters in New York City, besides its officers, representatives also of a considerable number of separate and independent synods. This body is coöperating in carrying on much world work of the National Lutheran Council. Of this Council, the head, as Executive Director, is Rev. Dr. J. A. Morehead, and the present Lutheran headquarters are in New York City at 39 East 35th Street.

Speakers.—The Second World Convention at Copenhagen, Denmark, opened June 26, 1929, with Dr. J. A. Morehead as its President. Among the speakers were 46 delegates, from America, Scandinavia, Germany, Hungary, India, Finland, Esthonia, France, Czechoslovakia, Rumania, Poland, Iceland, Jugoslavia, Holland, Latvia, Japan, Spain and Austria.

Subjects.—Among the subjects of discussion, were the duty of the present generation to transmit its heritage of faith to the next generation, Luther's Catechisms and the confessions, all of which Lutherans accept as faithfully as though they were not centuries old. The Westminster standards are "interpreted" in modern language; but the Lutheran *Book of Concord* is still a book of accord among the numerous followers of Luther. Among other subjects considered in Denmark's capital were the Lutheran idea of the relation between Lutheranism and the world and the Lutheran Church and the Social Crisis. It was held that it is the function of the Church to train the individual in every phase of social endeavor. Such individualistic helpfulness, according to Dean Moroni of Oslo, a speaker, "may become coöperative and produce institutions and organizations, but it is originally of the believer toward his brother; it does not concern itself with the kind of government under which the Christian lives, nor with the economic and social theories in vogue in his age and country." Continuing, the speaker added: "On the basis of data acquired in proclaiming the Gospel, the Church stands above and apart from secular parties, although her members derive from a desire to help each other their views on current social movements, poverty, unemployment, housing, war and class struggles." With attention concentrated on the Kingdom of God, which is eternal, "she is less concerned," Dr. Moroni observes, "about making the present a better world than about inheriting the better world made available through faith in Christ." President Knubel, of the United Lutheran Church of America, gave the same view as the other speaker quoted gave. He said: "We cannot transfer our allegiance to any idea that the Kingdom of God comes through the adoption of Christian conceptions by organized society apart from a change of heart on the part of the individuals who form that society." That is, social service societies must consist only of members of Christian Churches.

Communicants. — The *Lutheran News Bulletin*, of New York, calls attention to the fact that the statistics of communicants given by the U. S. Census, of 1926, include more than the confirmed communicants. They embrace, also, those 13 years of age and less; that is to say, the number of "13 years and over" in 1926, includes the baptized as well as the confirmed.

THE METHODIST COMMUNION

Foreign Missions and Service Incomes.—The year 1929, following 1928 when the General Conference of the Methodist Episcopal Church was held, was a quiet year. Two of the most notable events were: (1) the voting of the annual conferences on the constitutional question submitted, concerning the proposed measure of automatic control in the foreign mission fields by allowing the central conferences in the larger fields, as India, China, etc., to elect for themselves the bishops who are to assume episcopal functions, instead of having them elected by the General Conference. Each central conference, for example, as in China, includes all the annual conferences in that field, and in India, embraces all the annual conferences in that country. The annual conferences, meeting in the fall in all countries, have voted, and the returns show that they are overwhelmingly for the change. It is deemed almost certain that the conferences meeting in the Spring of 1930, will vote the same way. This would make a most important constitutional change. (2) The other occurrence which causes much concern in the Church is the tendency of decrease of income which manifests itself in the returns for world service and also of diminishing growth in the membership of the Church. It is indicated that there will be a net loss for the year 1929. The annual loss in contributions for home and foreign missions, except in the Woman's Home and Foreign Societies shows the result of reaction from the unusual effort to reach very high incomes ten years ago, as the Church shows a net loss in 1929 for the first time of over 56,000 members.

Duke University.—The Methodist Episcopal Church, South, has, it is said, the largest foundation in this country, in Duke University in North Carolina. This foundation yielded in 1928, besides the immense sums invested in the educational institution, an income of $46,071 for building rural churches, $36,918 for maintaining rural churches, $21,250 for pensions for Methodist preachers in North Carolina, and $117,155 for orphanages in the two Carolinas.

Union of Methodist Churches in England.—This process, which was begun several years ago, is on the eve of being completed by the merging of the Wesleyan Methodist Church, the oldest of Wesley's organizations, with the Primitive and United Methodist bodies. So far none of the numerous Methodist bodies in the United States has yet united, though the two largest and oldest, the Northern and the Southern, are still considering the matter, and the meeting of the Southern General Conference in May, 1930, may consider the question anew. Several large African bodies are reported to be showing more enthusiasm for union than when they had it up a number of years ago.

THE PRESBYTERIAN COMMUNION

Church of Scotland Union.—This is one of the largest and most widespread of the Protestant Communions. While the outstanding occurrence in the range of the Communion was unquestionably the union of the Church of Scotland, the "auld Kirk," with the United Free Church, and the end of disestablishment, which brought to an end the division of the days of great men like Dr. Thomas Chalmers. The meeting of representatives of the Communion itself, in Boston, was a world event.

Protestant Meeting in Boston.—The latter did not attract as much attention as the great meeting of the two bodies in Edinburgh, but it meets often even if it is a world body. There were three features worthy of mention, the older men present like Dr. Laws, the veteran missionary, some of the younger men, as the missionary from India who presented with such ability the report of the Eastern Section, a minister from Dundee who gave with balanced judgment the relations between religion and science; the discussion on church unity which is presenting itself so pressingly among Presbyterian and Reformed bodies, and the thought of what can be done, perhaps more easily than many now believe, among the 13 bodies in the United States. The Reformed Churches of Europe received much attention, as their numbers and distribution and importance deserve.

Princeton Theological Seminary.—Dissensions have resulted in a withdrawal of three of the professors of fundamentalist tendency, Wilson, Machen, and Allis, who propose to open a new seminary in Philadelphia which is to be called the Westminster Theological Seminary. President J.

Ross Stevenson and W. L. McEwan, heard of the Board of Trustees, have joined in a statement stating that the Seminary has stood in the 117 years of its existence with firm steadfastness for the propagation of Evangelical Christianity at home and abroad, as formulated in the Standards of the Church. Excepting the professors who have withdrawn, the faculty remain loyal and united for the truth. The Presbyterian Church in the United States has risen to 2,004,467, a net increase of 41,629.

Call for Union of Presbyterian and Reformed Bodies.—Various branches of this communion represented at a recent conference at Pen-Mar, Penn., adopted a resolution calling for immediate action toward union, following an address of Rev. Dr. William C. Covert, general secretary of the Presbyterian Board of Christian Education. The resolution pointed to the strong tide of sentiment "sweeping the various units into organic oneness, the technical machinery for immediate procedure already being set up, and the acute need in educational, missionary and humanitarian fields also calling for haste. Reformed and Presbyterian bodies are already united in the same communion, throughout the world and would find few obstacles in the way of merging among themselves.

THE REFORMED CHURCH IN AMERICA

When the Dutch settled in New Netherlands, they erected their first church there in 1628. Under the direction of the General Synod at its meeting in the Collegiate Church of St. Nicholas, Fifth Avenue and Forty-Eighth Street, the commemoration of the 300th anniversary was held. Other churches, whose history goes back to the same period,—Congregationalism, Episcopalianism, and Moravianism—were represented with gracious words of congratulation. The Reformed Church in America was in America before its sister church the Reformed Church in the United States came across the sea and helped the strangers from Germany to settle in Pennsylvania and to form an ecclesiastical organization. The Reformed Dutch Church is conferring with the Presbyterian Church in the United States concerning a union project.

THE SALVATION ARMY

Last year was a troubled year for this active and useful body. A meeting in London of representatives of the Army from various parts of the world took action removing the head of the Army, General Bramwell Booth, from its control on several grounds including age and infirmities, and elected in his place General E. J. Higgins, with some principles of control to hedge his administration. After some months, during which appeal to the courts by the retiring officer was accompanied with not a little disturbed feeling, quiet and and satisfaction were restored. In the first half of the present year General Booth died without having been reconciled to his removal from the Army.

THE ROMAN CATHOLIC CHURCH

By John B. Kelly

Spiritual Director, Catholic Writers' Guild

PRESENT STATUS

Membership and Clergy. — The Catholic Church in America, according to the most recently available statistics, is represented by a laity that numbers between 20,000,000 and 21,000,000 citizens. Its clergy numbers 26,273 ordained priests with about 15,000 studying for Holy Orders. There are about 3500 religious ministering in the 620 hospitals which are under the control of the church.

Schools And Colleges.—The most recent school survey shows 2,423,055 children in the elementary departments of the educational system. The ecclesiastical educational system embraces 10,087 Catholic schools, with a staff of 77,344 teachers. Of these 68,216 are supplied by the 117 teaching communities of religious. In the Catholic high schools which number 2242 there are 13,242 teachers, and in the 80 training schools caring for 15,959 students there are 1385 teachers. The 154 colleges and universities under Catholic Church auspices have a total of 5,743 teachers who instruct 74,899 students.

Charity and welfare work is carried on without regard to color, race, or creed. 128 homes for the aged care for 14,634 inmates. Orphanages (500) look after the physical and temporal needs of 80,000 dependents, while 620 hospitals care for an average of 350,000 patients a year. The infirm, the blind, the deaf and victims of cancer, are one with the poor, whose needs are ministered to by the various religious orders of the Church. The laity minister to those outside through such organizations as the St. Vincent de Paul Society which has 15,700 enrolled workers. The Church is daily training new recruits and introducing the latest approved methods of social service into the organized ministration of charity. There are 58 Bureaus of Catholic Charities functioning in as many dioceses for the relief and prevention of human distress, adopting the latest orthodox methods in the pursuit of a carefully defined program of action.

Rural American Catholicism embraces about 4,000,000 members. Steps are being taken daily for increasing the opportunities of religious and secular education of these. Recreational facilities are being supplied, and the Home Mission Board is providing for an increasing number of rural religious vacation schools. The Catholic women of the farm have been organized into groups for greater facility in teaching their functions as homebuilders and sustainers.

THE CATHOLIC PRESS

The Catholic Press reports the existence of 291 Catholic publications, and a circulation exceeding 7,000,000. It is supplying a news service to these along with a feature service. It has direct contact with Europe through its offices in Dublin, Paris, and Berlin. The hierarchy has found the Catholic Press instant in obeying its order to the effect that the policy of each publication in reports of political activities shall be to confine its comment to matters of Federal or local campaigns that affect the interests of the Church, alone, ignoring the political interests of any party or candidate. It has sustained such progressive measures as have come under Farm Relief, Industry and Commerce.

ECONOMIC CONCERNS OF THE CHURCH

Immigration has been an object of ecclesiastical solicitude. The newcomer to America is protectd from commercial exploitation by an organized body with offices in Washington, New York City at Ellis Island, El Paso and Juarez in Mexico. All notable attempts at proselytizing have been frustrated, and legal advice is offered to the immigrant in need of it.

Industrial problems of the nation are made a matter of ecclesiastical concern because of 3,000,000 unemployed within our boundaries. Movements are afoot for the abolition of insufficient wages to workers, bad housing conditions and attempts at monopolies that do injustice to employee or legitimately operating competitors. In the industrial sphere, labor unions have been approved by the Sacred Congregation of the Council. Employers and paid workers are being brought into closer understanding through insistence on the part of the Church that the rights of each shall be uncompromisingly sustained. All suggestions of class struggle are repudiated for the saner means of settlement through conferences of leaders. The Holy See has officially congratulated employers, as a body, for the many associations of relief for the laborer which the former have sponsored and sustained.

PEACE PROGRAM OF THE CHURCH

War Causes and Remedies.—The Catholic Peace Program has called upon the Press of the Church and the National Conferences of Catholic Men and Women to study the causes of war such as national pride *vs.* self-respect, the greed of economic imperialism, and of armaments that menace. War is presented as not essentially unjust, and even as being a last resort necessity, when there is a violation of human rights. Other molders of public opinion besides the press, such as the Catholic home, the school and the pulpit are consecrated by the American Catholic hierarchy to the apostolate of making peoples and nations understand each other better, using every medium of communication and transportation for establishing more intimate relations. Pope Benedict XV is echoed in the idealism of this nation seeking peace through "a solemn renunciation of war except as a last resort in the defense of human rights." A code defining international rights and wrongs is advised, and a world court of arbitration and adjudication advocated.

The Peace Program's founders have enlisted Catholic support hoping to find the Roman Catholic Church members as actively coöperative in this movement as they were in the nation's call for soldiery in the recent World conflict when 800,056 World War veterans of Catholic spiritual fealty returned to civilian life as veterans of the nation.

International Coöperation.—A program of international coöperation has been functioning based on such conferences as that held in Paris—the First International Congress of Family Life. The motion picture as a medium of better understanding was used to strengthen our Pacific relations through the Conference of Hawaii. The Warsaw Conference met for a study of international peace, and at Santiago and Havana there was held a conference on child welfare. The press of the Church sent its representatives to Cologne. The Catholic Church was represented in the Pan-American Conference of the Red Cross Society, together with mutual action for the suppression of white slavery.

CIVIC ATTITUDE OF THE CHURCH

Better citizenship ideals have been made a movement through an organized program now in action to train the citizen in a clear understanding of his duties, obligations and rights under the flag. Civic instruction is part of the curriculum of parochial schools. The alien is prepared for naturalization in day and night schools. The hierarchy through synods and pastorals is teaching devotion to the common good of the nation, its defense against unjust aggression, the preservation of peace and promotion of prosperity. Archbishop McNicholas of Cincinnati voiced the acknowledgment of the Church to the secular press of the nation in a speech that praised the latter for its part in condemning bigotry as a source of civic and national unrest. He expressed warm thanks to the great majority of non-Catholics who have steadfastly refused to believe those condemning the Church as an alien attempt to usurp governmental prerogatives. Two thousand Catholic societies have joined in a movement to educate all Americans in matters concerning Catholicism's sincerity in national allegiance. The Presidential campaign of a year ago is still evidencing the good that has come out of evil. There has been a nation-wide recoil from the minority representing bigotry on the part of the great wholesome, fair-play majority who have become more closely welded as Americans in their common disgust for groups of bigots who menace the nation's peace.

POLITICAL AFFAIRS

Mexico.—The Mexican difficulty has been largely settled through the establishment of a *modus vivendi* between the nation's bishops and Government officeholders. Through the good will of the latter, the Church is permitted to restore public worship, and with some measure of liberty it can now administer to the spiritual welfare of her children in Mexico. Religious peace is however, not yet visible in the sense of full religious liberty attained. The full demands of justice are still to be met.

The Papacy.—The past year has witnessed the restoration to the Papacy of that independent sovereignty which she has always claimed is hers by right as the head of the visible church of Christ. The National Catholic Welfare Conference has been endorsed by Pope Pius XI as a movement for "the glory of God, the welfare of the country, and the interests of the Church." The Pontiff's words are: "Cease not to labor in the spirit of unity for the welfare of our holy religion in the great Republic where the Church, under God's providence, enjoys such wide freedom, and such a high degree of prosperity."

AFFAIRS OF THE ORTHODOX ORIENTAL CHURCHES

By H. K. Carroll

General Statistician of the Church

WORLD CONFERENCE IN 1930

Purposes.—A very important event is to take place in this communion in 1930. It is a large communion, next to that of the Roman Catholic, made up of a number of autocephalous churches, aggregating, in the continents of Europe, Asia, Africa and North America between 127,000,000 and 128,000,000 members. This unusual occurrence is a world conference of the various churches composing it,—the Russian, the Greek or Hellenic, the Bulgarian, the Rumanian, the Serbian, the Syrian, the Armenian, the Albanian and the Coptic. It is to be held at Easter, the 1900th century of Christ's resurrection, at Mount Athos, a place rich in monasteries and libraries. The purpose of the Conference is to ascertain the condition of the Orthodox world "and to prepare in all ways possible for the assembling of a General Council, at some future, early date."

Christian Significance.—The meeting of representatives of twenty-two autonomous churches means something to the rest of Christianity as well as to the ancient orthodox, beginning in Constantinople, Antioch or Jerusalem and embracing other patriarchial sees in Cyprus, Sinai, Yu-Yugoslavia, Georgia, Poland, Ukrainia, Finland, Esthonia, Latvia, Lithuania, Czecho-Slovakia, Athens, Albania, Alexandria, Bulgaria, Rumania, North America, Japan and Russia. It is only lately that the older and larger Patriarchates have shown a willingness to recognize the smaller bodies as a part of the great communion. It will be remembered that some of these bodies were represented in the World Conference of Faith and Order which, under Anglican leadership was held in Lausanne, Switzerland.

The Patriarchate.—This year the Patriarch of Constantinople, Basil, has passed away and a successor, known as Phrotius, has come to the patriarchal throne and has also ecumenical in his title. He shows a willingness to admit Bulgaria, which has been out of relation, for some time, to the communion. The Anglican Church has been very friendly to the Oriental churches for some years and doubtless will continue to show its good will at the meeting next year of the Lambeth Council.

THE ORTHODOX PARTY IN THE UNITED STATES

In this country the Czarist Russian Church seems to be gaining in the courts over the Living Church (Soviet). A court in Connecticut has given a decree of control for a Russian Church in that state which has been in possession of the Soviet branch, and there is a movement in preparation for an appeal to courts in other states for the orthodox head, Archbishop Platon.

CONFLICT BETWEEN SOVIET AND CHURCH IN RUSSIA

New Calendar.—The course of the Soviet is becoming more rigorous in dealing with the Church. Among the acts in 1929 is the creation of a new calendar so arranged as to omit the day of worship (Vookresenye), leaving it to be fixed by the congregations, if at all, the attendance at worship being, according to the constitution, a matter of private concern.

Mennonites.—A thousand Mennonites, German descendants, who settled on the lower Volga, in the days of Catherine the Great, on her invitation, have moved to Moscow and asked permission to emigrate to Canada; but in order to do so they must pay 220 rubles ($110) for an exit visa which is impossible to the impoverished people. They have preserved their original language, customs and religion, but are so unhappy under the Government's repression that they will perhaps enact a tragedy if denied relief.

Evangelical Persecution.—Churches of the Evangelical group are subject to many persecutions. Their activity and growth make them the chief victims of the Soviet. J. H. Rushbrooks, whom many visits to Russia have made familiar with conditions there, says that priests and preachers are alike denied the right of voting and are assessed with special taxes. The Baptists, of whom there are a million, are especially objectionable to the Bolshevists because after the war they became pacifists. A new law has forbidden any church to help its own poor or to form Bible classes. The purpose is to break up religious bodies into isolated groups and then to paralyze the groups by seizing and imprisoning their heads. The Government's activity against the instruction of children in religion has, we are told by the editor of *The Christian Century*, of Chicago, who visited Russia in 1929, gone far beyond what it has been in the past. The Soviet is now making atheistic teaching to children the order of the day; it is imprisoning preachers by the score and has closed 500 churches of the active order.

Stalin and the Church.—The ruler of Russia, Stalin, received word, it is reported, early in December, that 15,000 persons who paraded recently in an anti-religious demonstration, collected 4,000 religious pictures from local churches and burned them in the center of the city. These were the sacred images so dear to members of the Orthodox Church. A dispatch to the *New York World*, early in December, said the Soviet Union will make the celebration much more difficult this year than ever before. It has prohibited the observance of the festival. Artists and singers who participate in them will be expelled from their unions. Stores are prohibited from selling Christmas trees or toys, or displaying them in shop windows. Church bells are being removed and melted. Nevertheless, the religious element are distributing hand-bills asking people to attend church service in yuletide.

ORTHODOX ORIENTAL CHURCHES IN THE UNITED STATES

For some years the leading Church of this group—Russian—has not furnished statistics to the public, being sharply divided by Sovietism but the United States census has given returns gathered in 1926 by its own methods for seven of them, excluding the Assyrian Jacobite Apostolic Church which is given separately. This body has 1,407 members, and the others are credited with the following returns: Albanian Orthodox, 1,993; Bulgarian, 937; Greek (Hellenic), 119,495; Rumanian, 18,853; Russian, 99,681; Serbian, 13,775; Syrian, 9,207. This, without the Armenian Apostolic Church makes an aggregate of 260,807.

JUDAISM AND JEWISH COMMUNAL AFFAIRS

By Bernard G. Richards

Executive Director, American Jewish Congress

GENERAL

Another period of growth and development marked the Jewish religious, communal and philanthropic activities for the past year. These public efforts in behalf of Judaism and the Jewish people may once more be roughly designated under the heading of several different movements, substantially as follows: 1. Religious education for the young and the training of rabbis, teachers and social workers; 2. The building of new synagogues and temples and the spread of the popular movement for the establishment of community centers; 3. Work of charity among the needy at home and the destitute abroad still suffering from the aftermath of the Great War; 4. Support for the upbuilding of the Jewish National Homeland in Palestine, and 5. Efforts to protect the interests and establish the rights of Jewish Minorities in Eastern European lands.

RELIGION AND SCHOLARSHIP

Hebrew Union College.—Of the associations, federations and institutions which have been established for specifically religious or religious educational purposes, the various theological seminaries seem to have led in the direction of the expansion of physical facilities and the extension of activities. First, the Hebrew Union College of Cincinnati, O. Dr. Julius Morgenstern, President, is planning a new group of buildings, with one special structure for its library, which boasts of one of the finest collections of Jewish books and manuscripts in the world. Through the tireless and persistent activities of Adolph S. Ochs, Chairman of the Endowment Fund of this college, almost the entire sum of $5,000,000 sought for this enlargement has already been secured. Mr. Ochs, himself, being one of four munificent donors of $500,000 each, the other donations of the same amount having been offered by Julius Rosenwald of Chicago, Mr. and Mrs. Frederick Brown of New York, several members of the Guggenheim family and several members of the Schiff-Warburg families.

Jewish Theological Seminary.—In keeping with this program of enlarging the facilities for Hebrew scholarship and the training of future spiritual leaders, the Jewish Theological Seminary, New York, Dr. Cyrus Adler, President, is to add additional buildings to its institution, including one especially designated to house the Jewish Teachers Institute, which is affiliated with this body. Here, too, the constant addition of rare books and manuscripts continues to enhance its unusually rich and distinctive library.

Scholarship Work.—These colleges, as well as the newer Jewish Institute of Religion, New York, Dr. Stephen S. Wise, President, each year sponsor the production of works of a scholarly nature which make the treasure-house of ancient Jewish lore and traditions accessible to the modern reader, such books usually being written by members of their faculties or invited lecturers of distinction. The Jewish Institute of Religion, which is also building up its library and encouraging research in several directions, has been especially noted for making possible the coming to this country of a number of noted savants who have brought European scholarship in closer touch with American research work.

Yeshiva College.—The newly established Yeshiva College, New York, Rabbi M. S. Margolis, President, which represents an expansion of the former ultra-orthodox Isaac Elchanan Theological Seminary, is still going through the stage of experiment in applying the parochial model to a college, but, with the accession of additional financial resources, it will, it is believed, be able to establish itself more firmly. Thorough study of the Torah and authentic scholarship, combined with ancient piety, are among the chief strivings of the institution.

Rosenwald Essay Prize.—Supplementing other steps intended to encourage the advancement of Jewish study and scholarship, Julius Rosenwald has offered to a specific committee a sum of $10,000 to be awarded for the best essays on the subject of "The Future of Judaism in America."

JEWISH EDUCATION

Endowment and Instruction.—The Jewish Education Association of New York, Israel Unterberg, President, and similar bodies in a number of different cities, continue to stimulate interest in the Jewish education of the young by the endowment of schools, the introduction of improved methods of instruction and other means which are likely to attract the children to specifically religious and Hebrew schools. In a number of large cities like Chicago, Boston, Cleveland, Detroit, St. Louis, San Francisco, there exist colleges or schools for the training of religious teachers to meet the requirements in different communities—those which are attached to the synagogues and temples,—like the Commission on Education of the Union of American Hebrew Congregations, as well as those which are conducted independently by associations of Jewish men and women especially interested in the subject.

Supplementary Bodies. — Supplementing the educational and cultural activities of other bodies are: Young Judea, an organization of the Jewish youth, sponsored by the Zionists, Rabbi Israel Goldstein, President; Avukah, American Student Zionist Federation, Samuel Blumenfield, President; Young Israel, congregations and study circles for the Jewish youth, Edward S. Silver, President; Young People's League of the United Synagogue of America, Herbert J. Roeder, President; Mizrahi Hatzoir, Harry Karp, President; Junior Hadassah, Miss Frances Lesser, President; Menorah Intercollegiate Association, Henry Hurwitz, Chancellor; the Hillel Foundation for work among students, fostered by the Independent Order B'nai Brith, Alfred M. Cohen, President.

SYNAGOGUES AND COMMUNITY CENTERS

New Building.—A large number of new temples and synagogues have been built in different cities during the past year, and in many instances very elaborate edifices have been erected with adjoining communal or social centers, libraries and lecture rooms.

Religious Training and General Education.—In the work of the synagogue and the extension of its influence in the direction of religious training and general Jewish education, bodies like the Union of American Hebrew Congregations, Charles Shohl, Honorary President, representing the reformed wing of Judaism; United Synagogue of America, Nathan D. Levy, President, speaking for the conservative or the middle-of-the-road elements; and the Union of Orthodox Jewish Congregations of America, Rabbi Hebert S. Goldstein, President, aiming to conserve the old and traditional attitude, have played an important rôle during the past year. Among the newer forces in the religious life of the Jews of America are the National Federation of Temple Sisterhoods, Mrs. J. Walter Freiberg, President, and the National Federation of Temple Brotherhoods, Roger W. Straus, President.

Community Associations.—Considerable advance has been made in a number of different cities during the year by the popular movement for the creation of Jewish community centers or Hebrew young men or women's associations, serving in most instances as combined houses of worship, religious schools and places of recreation. The Jewish Welfare Boards, Justice Irving Lehman, President, a joint outgrowth of early centralized activities of the Young Men's Hebrew Associations with later ministrations to Jewish members of the United States Army and Navy, especially from the World War, now directs its chief efforts towards the encouragement of the establishment of these and other Jewish social centers, and the development of educational and literary programs for them.

JEWISH NATIONAL HOMELAND

Jewish Agency and Palestine.—The Sixteenth Biennnal International Congress of the World Zionist Organization, held in Zurich, Switzerland, last August, characterized by intense and stormy sessions, incidental to the acceptance of a radical change of policy, was followed within a few days by the formation also in Zurich, of the long-projected Jewish Agency through which Zionists and non-Zionists—i.e. non-believers in the Jewish national political ideal, but adherents of the sentiment surrounding Palestine—are to coöperate in the constructive efforts of the Jewish resettlement in Palestine. The idea of the Jewish Agency, developed in accordance with previous decisions of the Congress, by Dr. Chaim Weizmann, President of the World Zionist Organization, and furthered by a group of prominent American Jews headed by the late Louis Marshall, was thus realized at the first session of this body held in Zurich, attended by many distinguished and influential men from different countries and which elected among its leading officers Dr. Weizmann, the late Mr. Marshall, Lord Melchett and Felix M. Warburg. The formation of this body was hailed as a notable event in Jewish life. All but one group of the Zionists opposed to the Agency, finally consented to enter the Agency and the general manifestation of unity was greeted as an occasion of good cheer for those who had long labored against the discouragement for the Zionist cause.

Jewish-Arabian Clash in Palestine.—The brighter Zionist horizon was, however, soon overcast by an entirely unexpected event in Palestine, the center of this hope. Beginning on August 23 a series of massacres of Jews by Arabian mobs, occurring spontaneously in a number of different communities, resulted in the loss of 119 Jews and 7 Arabs, the wounding of more than 300 persons and the destruction of property amounting to about a million dollars, painfully built up and created by the peaceful and industrious Jewish colonists. The immediate pretext for these acts of violence was the dispute regarding the privilege of the Jews to worship and to have access to the Wailing Wall, the Arab mobs in outlying districts, drawing fury from extravagant misrepresentations of this controversy, including the wild rumors of Jewish designs to destroy the Mosque of Omar.

New York Protest.—Jewish attachment to the aspiration for the rebirth of Zion was again proven by the dismay and mourning which overtook Jewish communities throughout the world. To give voice to the roused feelings of Jews of Greater New York and other cities, some 10,000 persons assembled in Madison Square Garden to listen to addresses of Senator William E. Borah and other distinguished men who spoke under the Chairmanship of Samuel Untermyer.

Relief Fund.—As a measure of immediate relief a Palestine Emergency Relief Committee was formed with David A. Brown as Chairman and this Committee subsequently collected a fund close to $2,000,000.

International Representations.—To voice the sense of outrage and indignation felt by Jewish citizens in this and other lands many large mass meetings and demonstrations were held. The American Jewish Congress and Zionist Organization of America made representations to the State Department in Washington, and to the British Ambassador to the United States. The indifference, if not hostility to Jewish aspirations in Palestine on the part of the Palestine Administration of the British Government, being apparently very largely to blame for the outbreak of the Arabs, England was publicly charged with violation of the pledge contained in the Balfour Declaration and the conditions which were attached to the Mandate over Palestine granted to Great Britain by the League of Nations. The Zionist World Organization and the newly formed Jewish Agency memorialized the British Government. Representatives of both organizations in this country also presented a memorandum to Premier MacDonald during his visit to the United States.

Investigation.—At the time of this writing a Parliamentary Commission made up of all the parties in the British Government, has been holding hearings in Jerusalem for a number of weeks and taking evidence as to the causes and sources of the disorders. The notable testimonies already recorded point to the reprehensible acts of instigators, who deliberately sought to foment trouble for the furtherance of interests that have nothing to do with the welfare of the broad masses of the Jewish or Moslem population. The Zionist policy of too excessive confidence and extreme conciliation being considered in part blameworthy, the lamentable occurrences in Palestine are not uncalculated to create changes in Zionist leadership, despite the credit which it gains from having achieved the extended and much desired Jewish Agency.

Results.—Meanwhile Jews are greatly encouraged by the splendid heroism displayed by Jewish colonists everywhere during the attacks and by the manifest determination of Zionists and Jewish sympathizers throughout the world to continue the support of all Palestinian Jewish enterprises. Extended plans of colonization now considered, await the decision of the British Inter-Parliamentary Commission.

EUROPEAN RELIEF

American Activities. — Continued destitution among Jewish communities of Poland, Russia and other Eastern European countries where ravages of the great war are still being felt by a large population, has made necessary the further relief activities of the American Joint Distribution Committee, Felix M. Warburg, President.

Russia.—The experiment has been made of placing some twenty thousand families on land in Crimea and Ukraine, granted by the Soviets. But a new policy of the Soviet Union, involving the industrialization of farms and introduction of a rigid system of collectivism seems to threaten the possible success of these agricultural settlements, even as it is causing the withdrawal from Russia of some fifty thousand German colonists who had the advantages of longer sojourn on the land. As previously indicated Julius Rosenwald, Chicago, has been the largest single donor to the funds for these agricultural enterprises, having originally contributed $5,000 toward a fund of $10,000. The Soviet campaign against all forms of religion and religious culture affects the Jews of the cities as well as of the rural districts to a greater extent than any other people and these repressive measures of the Government, has become more virulent in the last year. Attempts are now being made in the United States and elsewhere to arouse public opinion against these violations of freedom of conscience. Thus the Russian Jewish condition which previously presented only an economic problem now have to be included under the heading of legal disabilities, as the violation of elemental rights with which other lands have in recent years been associated. At the same time with over a million of declassed Jews within the Soviet Union, poverty and destitution is as acute as ever.

The suppression of Judaism, Jewish culture, and the persecution of the Zionists in Soviet Russia has been a special subject of action and public appeal by the American Jewish Congress in this country and by the Board of Jewish Deputies in England, the unreserved denunciation of these outrages by the Chief Rabbi of Great Britain, Dr. Joseph H. Hertz, making a specially strong impression.

Central Europe.—Violations of the rights of Jewish citizens and other forms of discrimination practiced from time to time in various Eastern European countries, more notably in Hungary, Poland and Roumania, etc., have continued to form the basis of activities, namely representations to the governments in behalf of just treatment, and appeals to public opinion, etc., of the American Jewish Congress, Bernard S. Deutsch, President; The American Jewish Committee, Dr. Cyrus Adler, President; and similar bodies abroad like the Joint Foreign Committee of England, Lucian Wolf, Secretary, and the Council for the Rights of Jewish Minorities, Geneva, Nahum Sokolow, Chairman, which the American Jewish Congress helped to organize at the Conference in Zurich, Switzerland, in August, 1927. The hope for improved conditions affecting the Jews in Roumania, occasioned by the advent of a new Government, headed by M. Maniu, has not been fully realized and anti-Jewish riots of students and other hostile public demonstrations, which marked the closing of the year, gave much concern to the various agencies which attempt to seek redress for Roumanian Jewry.

Protecting Minorities.—The combatting of various forms of anti-Semitism and misrepresentation constitutes another phase of the activity of the organization that is also identified with the protection of minorities abroad and similar efforts. Various agencies sponsoring the spread of good will and the removal of intolerance between Jews and Christians have received in different degrees the sympathy and coöperation from Jewish groups and organizations. Despite differences of opinion as to the value of good will that is artificially stimulated by speeches and resolutions, and, notwithstanding the serious charges made last summer that certain good-will activities are used as a mask for proselytizing effort, this movement generally appears to be meeting with favor especially in part of the extreme wing of Reform Judaism.

COGNATE SOCIETIES

NATIONAL CHURCHES

American Congregational Assn., 14 Beacon St., Boston, Mass.
American Theosophical Society, Wheaton, Ill.
American Unitarian Assn., 25 Beacon St., Boston, Mass.
Anglican Universal Church of Christ in the U. S. A., 22 E. 38th St., N. Y. C.
Board of Directors of the General Synod of the Reformed Church in America, 25 E. 22nd St., New York City.
Centenary Conservation Committee of the Methodist Episcopal Church, 111 Fifth Ave., N. Y. C.
Christian Science Church, 11 West 42nd St., N. Y. C.
Congregational Conference, Inc., 287 Fourth Ave., New York City.
Freethinkers' Society of New York, 226 W. 58th St., New York City.
Friends' General Conference, 1515 Cherry Street, Philadelphia, Pa.
General Conference of Seventh-Day Adventists, 140 Eastern Ave., N. W., Takoma Park, Washington, D. C.
General Council of the Presbyterian Church in the U. S. A., 156 Fifth Ave., N. Y. C.
National Lutheran Council in America, 437 Fifth Ave., N. Y. C.
National Spiritualist Assn., 600 Penn Ave., S. E., Washington, D. C.
Northern Baptist Convention, 5109 Waterman Ave., St. Louis, Mo.
Society for Ethical Culture of New York, 2 West 64th St., N. Y. C.
Union of American Hebrew Congregations, Merchants' Bldg., Cincinnati, O.
Union of Orthodox Jewish Congregations of America, 50 W. 77th St., N. Y. C.
United Lutheran Church in America, 39 E. 35th St., N. Y. C.
Universalist General Convention, 176 Newburg St., Boston, Mass.
Vedanta Society, 34 W. 71st St., New York City.
Volunteers of America, 34 W. 28th St., N. Y. C.

INTERNATIONAL ORGANIZATIONS

Alliance of Reformed Churches Throughout the World Holding the Presbyterian System, 510 Witherspoon Bldg., Philadelphia, Pa.
Association for the Promotion of Christian Unity, Chamber of Commerce Bldg., Room 412, Indianapolis, Ind.
Baptist World Alliance, Bates College, Lewiston, Me.
Central Bureau of Evangelical Churches in Europe, 105 E. 22nd St., N. Y. C.
Committee on Coöperation in Latin America, 419 4th Ave., N. Y. C.
Continuation Committee of World Conference on Faith and Order, P. O. Box 226, Boston, Mass.
Ecumenical Methodist Conference, 145 Westervelt Ave., Plainfield, N. J.
International Assn. of Daily Vacation Bible Schools, 100 E. 42nd St., N. Y. C.
International Congregational Council, 14 Beacon St., Boston, Mass.
International Congress of Religious Liberals. 25 Beacon St., Boston, Mass.
International Council of Religious Education, 1516 Mallers Bldg., 5 S. Wabash Ave., Chicago, Ill.
International Evangelistic Bureau of the U. S. A., 1111 Walnut St., Cairo, Ill.

International Society of Christian Endeavor, 41 Mt. Vernon St., Boston, Mass.

Lambeth Conference, Anglican Communion, Bishop of Winchester, England.

Lutheran World Convention, 437 Fifth Ave., New York City.

Protestant Unity League, 71 West 23rd St., New York City.

Universal Christian Conference on Life and Work, 70 Fifth Ave., N. Y. C.

World's Student Christian Federation, 70 5th Ave., New York City.

World's Sunday School Assn., 1 Madison Ave., N. Y. C.

INTERCHURCH ORGANIZATIONS

American Secular Union, P. O. Box 1109, Chicago, Ill.

American Sunday School Union, 1816 Chestnut St., Philadelphia, Pennsylvania.

Chaplains' Aid Assn., 401 W. 59th St., New York City.

Christian Unity Foundation, 70 Fifth Ave., New York City.

Church Peace Union, 70 Fifth Ave., New York City.

Commission of Reference and Council Committees, 25 Madison Ave., N. Y. C.

Conference of Theological Seminaries and Colleges, Lancaster, Pa.

Council of Church Boards of Education, 111 Fifth Ave., N. Y. C.

Federal Council of Churches of Christ in America, 105 E. 22nd St., N. Y. C.

Federation of Churches, 71 W. 23rd St., N. Y. C.

Fellowship of Reconciliation, Bible House, N. Y. C.

Interdenominational Evangelistic Assn., Winona Lake, Indiana.

National Council of Protestant Episcopal Churches, 281 Fourth Ave., N. Y. C.

National Federation of Religious Liberals, 700 Oakwood Blvd., Chicago, Ill.

AUXILIARY ORGANIZATIONS

Catholic Church Extension Society of the U. S. A., 180 N. Wabash Ave., Chicago, Ill.

Catholic Guardian Society, 130 W. 37th St., New York City.

Catholic Protective Society, 477 Madison Ave., New York City.

Epworth League of the Methodist Episcopal Church, 740 Rush St., Chicago, Ill.

Kings Daughters and Sons, 280 Madison Ave., New York City.

Lord's Day Alliance, 156 Fifth Ave., N. Y. C.

Prison Evangel Assn., 156 Fifth Ave., N. Y. C.

Sunday School Commission, Inc., 416 Lafayette St., N. Y. C.

Woman's Christian Temperance Union, Evanston, Ill.

Woman's National Sabbath Alliance, 156 Fifth Ave., N. Y. C.

Young Men's Christian Assn., 347 Madison Ave., New York City.

Young Women's Christian Assn., 600 Lexington Ave., New York City.

RELIGIOUS PUBLICATIONS

American Baptist Publication Society, 1701 Chestnut St., Philadelphia, Pa.

American Bible Society, Bible House, N. Y. C.

American Tract Society, 7 W. 45th St., N. Y. C.

Chicago Tract Society, 440 S. Dearborn St., Chicago, Ill.

Gideons, 140 S. Dearborn St., Chicago, Ill.

Institute of Social and Religious Research, 230 Park Ave., N. Y. C.

National Testament and Tract League, 200 Kellogg Bldg., Washington, D. C.

Pocket Testament League, 156 Fifth Ave., New York City.

Religious Education Assn., 308 N. Michigan Ave., Chicago, Ill.

Religious Publicity, 701 W. 177th St., N. Y. C.

Society for the Propagation of the Faith, 462 Madison Ave., New York City.

Society of Biblical Literature and Exegesis, Broadway at 120th St., N. Y. C.

MISSIONARY

American Board of Commissioners for Foreign Missions, 14 Beacon St., Boston, Mass.

American McAll Assn., 1713 Sansom St., Philadelphia, Pa.
Christian and Missionary Alliance, 260 W. 44th St., N. Y. C.
Continuation Committee of the World Missionary Conference, 25 Madison Ave., N. Y. C.
Council of Women for Home Missions, 105 E. 22nd St., New York City.
Federation of Women's Boards of Foreign Missions, 419 Fourth Ave., N. Y. C.
Foreign Missions Conference of N. A., 419 Fourth Ave., N. Y. C.
International Missionary Conference, 347 Madison Ave., N. Y. C.
International Missionary Union, 71 W. 23rd St., N. Y. C.
Near East Relief, 149 Fifth Ave., N. Y. C.
Student Volunteer Movement for Foreign Missions, 419 Fourth Ave., N. Y. C.
Woman's Union Missionary Society, 67 Bible House, N. Y. C.

PART SIX
SCIENCE—PRINCIPLES AND APPLICATION

DIVISION XVIII
MATHEMATICS AND ASTRONOMY

MATHEMATICS

By Tomlinson Fort
Professor, Lehigh University

RESEARCH

General.—The amount of research done each year by American mathematicians continues to increase. During 1929 nearly five hundred papers were presented to the American Mathematical Society. Each of these papers was accepted by the program committee as embodying some mathematical theory new to the world. Not all papers presented to the Society are published. However, many are published and the problem of adequate publication facilities is increasingly acute. To review this vast mass of mathematics is out of the question. Moreover, mathematical research is so technical in character that to even understand what it is about requires that the reader be trained in the particular portion of mathematics in question. Consequently in this article only a few things will be mentioned which seem of outstanding importance or particularly easy to comprehend and of possible widespread interest.

Fermat's Last Theorem.—Pierre de Fermat (1061-65) left a note, probably only a surmise, that the algebraic equation $x^n + y^n = z^n$, $xyz = 0$ could not be satisfied by ordinary integers if n is an ordinary integer greater than 2. Note that $3^2 + 4^2 = 5^2$, that is that if $x = 3$, $y = 4$ and $z = 5$ the equation $x^2 + y^2 = z^2$ is satisfied. This equation can be satisfied by numerous other sets of integers. Now the theorem states that $x^3 + y^3 = z^3$ and other similar equations where the exponent is greater than 2 can not be satisfied in this way by ordinary integers. The theorem has defied proof. It has been proved for many values of n but has not been proved for all values of n. Many mathematicians have worked to either prove or disprove the theorem. At one time a prize of one hundred thousand marks was offered for a proof. The prize was not awarded. The efforts of the workers have lead to an extensive development in the theory of numbers which probably would not otherwise have been made; particularly to be mentioned is the very interesting theory of so-called "ideals." Such developments give the theorem particular importance. The American mathematician who has worked most on Fermat's last theorem is H. S. Vandiver of the University of Texas. He published an extensive memoir on the whole subject in the *Transactions* of the American Mathematical Society for October, 1929. In this he treats the particular question at issue and also obtains in addition new results in the theory of numbers.

The Calculus of Variations.—This topic is not so easy to understand as is Fermat's theorem. It, however, is occupying a preëminent position in American mathematical research now and must be mentioned in this article. It is fundamentally concerned with the determination of maximum and minimum values of definite integrals. The theory has previously for the most part been what is known by mathematicians as an "in the small" theory. Marston Morse has developed largely by his own efforts a calculus of variations "in the large." Mathematicians regard this as very fine work. Professor Morse published several papers on this subject during 1929.

Polygenic Functions.—This new and interesting field of mathematics had its inception a few years ago with two American mathematicians, Edward Kasner and E. R. Hedrick. It has to do with functions of a complex variable which do not have a unique derivative. The subject seems to have great possibilities and it is surprising that it had not been developed earlier. Papers of moment were presented to the American Mathematical Society during 1929.

Bequest.—The American Mathematical Society appeared as residuary legatee in the will of the late Miss Marion Reilly of Bryn Mawr. This sets a particular precedent as being in support of research by supporting that organization which has made mathematical research in America possible. Bequests for promoting research have generally gone to educational and other institutions.

GIBBS LECTURE

Social Science.—Probably the address of widest interest in 1929 was the Josiah Willard Gibbs lecture delivered by Prof. Irving Fisher of Yale at Des Moines Dec. 31 under the joint auspices of the American Mathematical Society and the American Association for the Advancement of Science. Prof. Fisher spoke on *Mathematics and the Social Sciences*. This lecture is judged to have been of such widespread interest as to justify the following abstract as prepared by the lecturer: "I can never forget the debt which I owe, as a pupil, to J. Willard Gibbs and the help which my studies with him have afforded me even in the field of the social sciences. He towered, head and shoulders, above any other intellect with which I ever came in contact. He has been rightly called the Sir Isaac Newton of America. His work in vector analysis has proved useful not only to physicists and to pure mathematicians but to several economists including Professor Ragnar Frisch, of Oslo, and myself. This is one of many examples of the applications of mathematical concepts and methods to the social sciences."

APPLICATION TO SOCIAL SCIENCES

"There are several fairly distinct branches of social science to which mathematics has been or may be applied. These may be distinguished (1) pure theory, (2) the fitting of formulæ to statistics, (3) correlation, and (4) probabilities.

"In pure economic theory mathematics is chiefly used for expressing concepts clearly and for short chains of reasoning. For instance, mathematics has served economic theory by supplying fundamental concepts based on the differential calculus and, through the process of differentiation, it has helped solve questions of maxima and minima, such as determining formally what is the maximum price that the traffic will bear in order to make profits a maximum. The chief realm of economic theory to which mathematical analysis of this formal kind applies is that of supply and demand, the determination of prices, and the theoretical effect of taxes or tariffs on prices.

***N* Dimensions in Economics.**—Another elementary, but important, use of mathematics in economics is in making sure that a problem is determinate by counting and matching the number of independent equations and the number of unknown quantities. Still another use is in illustrating geometrically or analytically the fact that a price, or a "marginal utility," is a function of not simply one but of many variables. In fact the economic world is a world of "n" dimensions. Mathematics also helps make clear the "dimensionality" of the economic magnitudes treated. The old "wage fund" theory would have been exploded much earlier than it was if mathematics had been invoked to make clearer the distinction between a "fund" and a "flow." Wages are not a fund but a flow.

Graphic Method.—The fitting of formulæ and curves to statistics has, of course, been the effort of statisticians for many generations. With the development of statistics in industry this art of curve fitting by mathematical methods, has grown very rapidly, and examples of it will be found in many current issues of Statistical Journals.

The third group of mathematical work in the social sciences, the development of correlation was started with Karl Pearson of the University of London, who is still living. His "correlation coefficient" has become almost a standard procedure in economic statistics as well as in other sciences, including biology in which he is primarily engaged. As to the subject of probability, the scatter and distribution of statistical data of all sorts have been increasingly studied by many economists especially the late F. Y. Edgeworth, editor of the Royal Economic Journal. Mathematics has come to stay in the social sciences as elsewhere and the outlook is that it will prove of increasing use and usefulness as time goes on.

ENGINEERING

Next in interest to the Gibbs lecture probably were the lectures at the Symposium on Differential Equations in Engineering held by the American Mathematical Society at Lehigh University, Dec. 28. The two things taken together seem to show an increasing interest in applied mathematics on the part of American mathematicians. The speakers at this symposium with the subjects of their addresses were: H. W. March, "The Problem of Diffusion"; Vannevar Bush, "Integraphs for Differential Equations"; T. H. Gronwall, "Numerical Integration of Differential Equations"; A. Nadai, "Plasticity and Related Problems of Non-rigid Bodies"; R. H. Clark, "Analytic Determination of Flux Plots"; S. Timoshenko, "Problems in Elasticity."

OTHER ADDRESSES

Among others to deliver special or invitation addresses before the American Mathematical Society were E. B. Van Vleck, G. H. Hardy, Hermann Weyl, T. C. Fry, Marston Morse, Virgil Snyder, F. D. Murnaghan, J. L. Walsh, James Pierpont, Tomlinson Fort and R. L. Moore. The address of Virgil Snyder was noteworthy as being his retiring presidential address and the addresses of R. L. Moore as being of the colloquium series which has been continued by the Society for many years. Other addresses were given before the Mathematical Association of America and Section A of the American Association for the Advancement of Science.

H. E. Slaught of Chicago delivered lectures at Lehigh, Lafayette, Rutgers and Swarthmore in March. His topic was "How mankind learned to count" and the purpose of his lectures was the popularization of mathematics on the campus. He has an unusual faculty for awakening enthusiasm in the student.

HISTORY OF MATHEMATICS

Encyclopedia Britannica.—The 14th Edition published in 1929 was prepared on a somewhat different basis from than of previous editions. A corps of Associate Editors was formed, each an expert of recognized eminence. David Eugene Smith, Professor Emeritus of Mathematics, Teachers College, Columbia University, who has devoted a lifetime to the history of mathematics, arranged the work of the department. Many of the articles are by Americans, among them J. W. Alexander, R. C. Archibald, H. Bateman, E. T. Bell, A. A. Bennett, G. D. Birkhoff, L. E. Dickson, G. A. Bliss, V. Bush, Florian Cajori, R. D. Carmichael, D. R. Curtis, W. B. Fite, O. C. Hazlett, D. Jackson, J. F. Ritt, J. B. Shaw, E. B. Van Vleck, J. W. Young and Oswald Veblen. Prof. Smith himself has contributed a number of articles.

Source Book in Mathematics.—This publication by David Eugene

Smith is the second volume in the Source Book series, sponsored by several of the leading philosophical and scientific societies and launched last year with the publication of Shapley and Howarth's *Source Book in Astronomy.* Mr. Smith's book presents significant passages from the works of the foremost contributors to the science of mathematics during the past four and a half centuries, closing with the year 1900. Various branches of mathematics are covered from their beginnings so that the reader may follow the growth of the science, see how it has developed, appreciate more clearly its present status and understand its future possibilities. Over ninety selections have been included in the volume, the work of each author being preceded by a short biographical note.

Ahmes Papyrus.—The year marks the long expected appearance of the facsimile and translation of the *Ahmes Papyrus* edited and prepared by A. B. Chace.

Special articles on the history of mathematics have been appearing at intervals in *Science.* Among these a notable one on "Babylonian Mathematics" by R. C. Archibald suggests that it may not be very long before we know more about Babylonian than about Egyptian mathematics. The controversy concerning the question of originality in Indian mathematics is carried on in *Isis* in an article entitled "Notes on Indian Mathematics" by S. Ganguli. George Rusby Kaye who had been one of the most active participants in this controversy, contending that the early Hindu mathematicians were dependent solely upon the Greeks and showed little originality except in the framing of fancifully worded problems, died July 1, 1929.

BIBLIOGRAPHY

An advisory group of the Carnegie Corporation consisting of college administrators and librarians under the chairmanship of W. W. Bishop of the University of Michigan has been authorized to prepare a list of those basic books which ought to be on the shelves of every reasonably well stocked college library. The advisory group selected Chas. B. Shaw, librarian of Swarthmore College, to edit the list and the faculty of Swarthmore College to make revisions. The first lists of books in the field of mathematics were sent out about the middle of June, as follows: *A Source Book in Mathematics,* edited by David Eugene Smith; *A History of Mathematical Notations,* Vol. II, by Florian Cajori; *Algebraic Geometry* and *Theta Functions* by A. B. Coble; *Automorphic Functions* by L. R. Ford; *Foundations of Potential Theory* by O. D. Kellogg and *Modern Geometry* by Roger Johnson. Noteworthy books announced by their publishers as soon to appear include, *Introduction to Higher Geometry* by W. C. Graustein, *Differential Equations* by F. R. Moulton, and *Theory of Infinite Series* by Tomlinson Fort.

TEACHING OF MATHEMATICS IN SECONDARY SCHOOLS

Demonstrative Geometry in the Ninth School Year.—The Report of the National Committee (p. 25) on Mathematical Requirements recommends "the demonstration of a limited number of propositions with no attempt to limit the number of fundamental assumptions, the principal purpose being to show to the pupil what demonstration means." Acting on this suggestion, the *Tentative Syllabus in Junior High School Mathematics* published by the State Department of Education of New York in 1928 (introduced in the schools in the year 1928-1929), includes Demonstrative Geometry. The syllabus states that "the transition, in the ninth year, to demonstrative geometry should be attempted only by pupils of at least normal intelligence. Pupils who are retarded in their mathematical work should continue the study of the topics outlined above (in the syllabus). The outline of this unit is meager. It is as follows: "Conceptions of formal proof. Introduction to demonstrative geometry. (Whether their proof be assumed or not the three cases of congruent triangles should be made the basis of a number of the very simplest variety of original exercises."

Fourth Yearbook of the National Council.—The fourth yearbook of the National Council of Teachers of Mathematics entitled, *Significant Changes and Trends in the Teaching of Mathematics Throughout the World Since 1910*, included reports from Austria, Czechoslovakia, England, France, Germany, Holland, Hungary, Italy, Japan, Russia, Scandinavia, Switzerland and the United States. The date in the title is about the time of the appearance of the epoch-making reports of the International Commission on the Teaching of Mathematics. The changes effected as a result of the work of the Commission have been so great that the survey represented by the yearbook was greatly needed.

College Entrance Requirements in Geometry.—A proposal has been made to the College Entrance Examination Board that it should modify its requirements so as to bring about the more extensive introduction of courses including an appreciable amount of solid geometry in the first year of geometry, in place of a part of the plane geometry ordinarily taught. In response to a request from the Board, a committee has been appointed by the Mathematical Association of America and the National Council of Teachers of Mathematics to discuss the feasibility of the proposal.

Unit of Calculus in Secondary Schools.—The movement to include a unit of Calculus in the Secondary School curriculum is taking definite form. This is further evidence of the influence of the report of the National Committee on Mathematical Requirements (See p. 38ff). Teachers College, Columbia University, has for several years offered a course entitled, "Demonstration Class in High School Mathematics." The four demonstrations weekly in the teaching of mathematics to pupils in the junior class of Horace Mann High School for girls is supplemented by lectures. This course has recently been devoted to work in calculus. It is significant that Teachers College is offered for the first time in September, 1929, a course under the title: "Professionalized Subject Matter in Senior High School Mathematics. This course shows how to present certain selected topics in analytic geometry and calculus to high school students who have completed plane geometry and intermediate algebra. The course has proved to be popular with a registration of 120.

MEETINGS

The American Mathematical Society held meetings as follows: New York, February 23; Chicago, March 29-30; New York, March 29-30; Stanford University, April 6; Berkeley, June 20-21; Boulder, August 27-30; New York, October 27; Ann Arbor, November 29-30; Pasadena, November 29; Bethlehem, December 27-28; and Des Moines, December 30-31.

The Mathematical Association of America held meetings at Boulder August 26-27 and Des Moines December 31. There also were numerous sectional meetings of this Association.

The Pi Mu Epsilon Mathematical Fraternity held its annual meeting at Des Moines in conjunction with the meeting of the A.A.A.S.

The National Council of Teachers of Mathematics met in Cleveland on February 22-23. Among the speakers were L. C. Karpenski, C. N. Moore, W. D. Reeve, Florence B. Miller, W. W. Rankin, Agnes G. Rowlands, J. O. Hassler and C. H. Judd.

MISCELLANEOUS

Prizes.—The endowment for the Frank Nelson Cole Prize in Algebra was doubled by Charles A. Cole, son of Frank Nelson Cole, professor of mathematics at Columbia University and for many years secretary of the American Mathematical Society. This prize was established some years ago and is awarded for research in Algebra. It is administered by the American Mathematical Society.

Foreign Visitors.—Noted mathematicians and mathematical physicists from abroad to visit America in 1929 included Hardy, Rado, Weyl, Sommerfeld, Heisenberg and Hund. Of particular interest was the Symposium held in Washington in April at which the latter four were speakers. Hardy led a symposium in New York on

Fourier Series, also held in April. In December, 1928, a symposium on quantum mechanics at which Weyl spoke was held in New York under the joint auspices of the American Mathematical Society and the American Physical Society. All papers read at that time were published during 1929 in the *Journal* of the Franklin Institute (Vol. 207, No. 4).

Einstein.—The original manuscript of Einstein's paper on gravitational and electro-magnetic theory which created so much discussion in the spring has been obtained by Wesleyan University. It is interesting to remark that this paper was cabled to the New York *Herald-Tribune* and a translation published on the first page of that daily the same day that the paper was published in Germany. No technical mathematical paper has ever aroused such widespread interest.

The Pi Mu Epsilon Mathematical Fraternity established chapters during the year at University of Oklahoma, Lehigh University and University of California at Berkeley.

OBITUARY

Henry Burchard Fine, dean of Department of Sciences, Princeton University and for many years administrator and professor of mathematics at that University, died on December 22, 1928. This death was not during the calendar year 1929 but was of such importance to the mathematical world as to warrant mention in this article. Dean Fine had been president of the American Mathematical Society and a member from its inception. He was noted for his research on the number concept and on functions defined by differential equations. Moreover, much of the present high standing of Princeton as a center of mathematical scholarship is due to his skillful administration of departmental affairs.

ASTRONOMY

By Bancroft Walker Sitterly

Professor, Wesleyan University

PLANETARIA

Museums.—Chicago will have early in 1930 a Planetarium and Astronomical Museum, the gift of Max Adler, of that city. The center of the building will be occupied by the seventy-foot dome of the Planetarium itself, and offices and rooms containing astronomical exhibits of every kind will surround this; the whole structure will be one hundred and sixty feet in diameter. The director will be Dr. Philip Fox, formerly director of the Observatory of Northwestern University. It is expected that another Planetarium, presented by Mr. Samuel S. Fels to the Franklin Institute of Philadelphia, will be in operation by the end of 1930. And plans are in preparation for the future erection of a Planetarium and Astronomical Wing to the American Museum of Natural History, N. Y. C.

The Modern Planetarium is a German invention. There have been from ancient times models of greater or less elaboration, which represented the arrangement and motions of the heavenly bodies by the use of circles, bars, and cogwheels; many of these have been marvels of intricacy and ingenuity. The most difficult celestial motions to represent in this way are exactly those which are directly within the experience of the ordinary man,—the apparent motions as we see them on the sky, the motions which Ptolemy attempted to explain with his complicated epicyclic theory, and which Kepler explained away by showing how the simple combination of elliptical motions of the planets and the earth together would account for all their superficial confusion. These motions are seen by us projected on the dome of the sky, and the invention of Dr. Bauersfeld, of the Zeiss Optical Works of Jena, was a machine for projecting optically images of the heavenly bodies upon a great dome from within. The images of the stars are projected from the center of the dome by a series of stereopticons which may be rotated to show the stars' risings and settings. For each planet a lantern on the central machine is given automatic motions reproducing the true motions of planet and earth; their combination causes the light-spot which represents the planet on the dome to trace out the planet's apparent path on the sky. The result is amazingly realistic. The operator of the machine can reproduce the motions of the heavenly bodies forward or backward, rapidly or slowly; he can show the heavens as they appear at the equator or the pole, as they were thousands of years ago or as they will be far in the future. In spite of the great expense of these Optical Planetaria, there are fifteen in Germany, two in Italy, one in Austria, and one in Russia, and that the United States will have two next year, with another in the not-distant future, is matter for satisfaction none the less strong because delayed.

AMERICAN ASTRONOMICAL SOCIETY

The winter meeting for 1928-29 was held in New York City, in affiliation with the American Association for the Advancement of Science, with papers on subjects ranging from the influence of sun-spots on radio reception to the spectrum of an "artificial planet" constructed in the laboratory. The high spots were perhaps the vice-presidential address of Director Adams of Mt. Wilson Observatory, on the proposed 200-inch telescope, and the public lecture of Director Shapley of Harvard Observatory, on the great systems of nebulæ (see below: *Groups of Universes*). The summer meeting was held at Ottawa, and was especially featured by the series of papers from the Canadian observatories and from some of the scientific bureaus of the Dominion Government, giving an interesting, comprehensive view of the broad front along which advances were made during the year. As in most of the recent meetings, a large proportion of the Society's papers dealt with spectroscopic studies (see below: *Stellar Spectroscopy*).

THE SUN

Studies of Solar Lines.—That the Fraunhofer lines of the solar spectrum reveal to us the presence of many of the same elements volatilized in the sun's atmosphere, that are present in the atmosphere and crust of the earth, has long been well known. It has also been possible to estimate with closer and closer approximation the physical state of those elements, especially their temperature, by comparing with one another the Fraunhofer lines. And recently advances on the one hand in instrumental power and on the other hand in the theory of line spectra have made feasible an attack upon the question of the abundance of the elements in various parts of the sun's atmosphere. The method developed last year at Mt. Wilson Observatory, for estimating the number of atoms concerned in the production of a solar line, and more precise theoretical studies of certain important lines, are being energetically applied to the high-dispersion spectrogram obtained by the observatory's powerful instruments.

Results.—A summary of progress to the present, by Professor H. N. Russell, includes some striking results. First, many elements have such an atomic constitution that their principal spectral lines do not occur in that region of the solar spectrum which we can study. About them we must remain at present almost wholly ignorant. Second, among those we can study, hydrogen is enormously the most abundant, being by weight about equal to all the rest together, and by volume ten times as abundant as all the rest. Next by volume come helium and oxygen, about equally abundant, then the six metallic elements,—sodium, magnesium, silicon, potassium, calcium, and iron,—then the hosts of free electrons. By weight, oxygen and the metals contribute each about half the amount that hydrogen does, and helium about half of that. The pressure at the base of the "reversing-layer" of the sun is around one two-hundredth of atmospheric pressure at the earth's surface. These results are preliminary, of course, and may be considerably altered as the methods used are further refined.

SOLAR ECLIPSES

Annular Eclipse.—There were two eclipses of the sun in 1929, a total eclipse May 9, and an annular eclipse Nov. 1. The annular eclipse ran from the North Atlantic Ocean across Africa to the Indian Ocean. As annular eclipses are unsuitable for study of the solar surroundings, since the whole solar disc is not covered up, no expeditions observed this one.

Total Eclipse.—For the total eclipse numerous expeditions from America, Europe and Japan went out to Sumatra, Siam and the neighboring territories, and the Philippines. Most of the parties appear to have obtained some results, though in no case were conditions ideal. The party of Professor Miller of Swarthmore, in Sumatra, obtained some beautiful corona photographs and some apparently excellent plates for measuring the Einstein deflection, but their sky was not wholly free from haze. It is Professor Miller's seventh consecutive success. In the same region Professor Freundlich's German expedition and Professor Yamamoto's Japanese party obtained some good results. In Siam clouds intervened; in Kedah the eclipse could be seen through clouds, but the only scientific work which had any success seems to have been the photometric measurement of the corona by Professor Stetson of Harvard, the spectroscopic investigations of the Cambridge (England) observers being spoiled. In the Philippines, there was also haze, but the photographs of the United States Naval Observatory party appear to have suffered but little from it. It is hoped that comparison of these photographs with the similar ones taken by Professor Miller will be of much value, for the stations were 25° apart in longitude, so that the eclipse occurred in the Philippines more than an hour later than in Sumatra, and if any rapid changes took place in the corona, the photographs should show the differences. Of course, the final results of the expeditions will not be completely discussed for a year or more yet, so that it is impossible now to judge what valuable confirmations or disproofs our present knowledge of the sun's immediate surroundings has received in these few additional minutes of intensive study (the time was five minutes in Sumatra, three in the Philippines).

MINOR PLANETS

Orbit Computation.—When the first minor planet was discovered on the first night of the nineteenth century and lost again after six weeks, it furnished to Gauss the occasion for the first employment of his classic method of orbit determination. Ever since then, the minor planets have been taxing the ingenuity and energy of computers. For the ordinary methods of orbit computation, in which only the influence of the sun on the planet is of importance, become ineffective with minor planets, which are very greatly influenced also by Jupiter and sometimes other planets. But methods which take account of other influences than the sun's are very laborious, and there are more than a thousand minor planets to be cared for. Various approximate methods have been devised for keeping track of the more important of them; for the rest the usual methods have had to suffice in spite of their inadequacy.

Survey of Watson Planets.—Among the earlier minor planets discovered were twenty-two found by Professor Watson of the University of Michigan. In his will he left a fund to provide for the computations necessary to keep track of his discoveries. Since 1900 this work has been carried out at the University of California, under the direction of Professor Leuschner, and has yielded, in addition to required tables of Watson's planets, much valuable experience of the merits of various methods of orbit computation. Three years ago, under the auspices of the National Research Council, Professor

Leuschner undertook a general survey of which the arduous nature and comprehensive scope may be judged from the words of his report: "The purpose of this work is to lay a foundation for future research on the motions of the minor planets by collecting in systematic form all the permanent results of the investigations made by astronomers on this subject since the discovery of the first minor planet at the beginning of the last century." He now announces that this survey is complete, except for final revision, for all the 1091 definitely known minor planets. A great advance has been made upon a problem which grows every year more formidable; in 1928 the minor planets discovered were 166 in number.

COMETS

Schwassmann and Wachmann.—Like 1928, 1929 was a year of few comets. Doctors Schwassmann and Wachmann, of Bergedorf, Germany, found one of the eleventh magnitude on January 17. The comet was afterward found on a number of photographs which had been taken at Yerkes Observatory and Harvard earlier in January and in December, so that it was possible almost immediately to calculate a rather trustworthy orbit. Like the orbit of the comet discovered in 1927 by the same observers, it is of small inclination and eccentricity and short period, like a minor planet orbit, resembling rather closely, indeed, the orbit of (525) Adelaide, one of the lost minor planets.

Forbes and Neujmin.—On August 1 Forbes at Capetown, South Africa, discovered an eleventh magnitude comet, and the next day Neujmin of Simeis, in the Crimea, detected another, still fainter. Both these observers also have discovered comets before, the last comet of 1928 having been picked up by Forbes and Yamasaki independently, while Neujmin has discovered two other comets (one at two returns) and numerous minor planets. On November 12 Carpenter, of the Observatory of the University of Arizona, found a very faint cometary image on a plate taken November 2. Up to this writing no other observation of this object has been secured. Three expected periodic comets were searched for in vain, Perrine's and Giacobini's comets of 1896 and Metcalf's of 1906. But the giant comet of Stearns (1927) remained faintly visible in great telescopes though as far from us now as Saturn is.

Wilk of Cracow.—A fourth comet, and perhaps the brightest of the year, was discovered by Wilk of Cracow, Poland, on December 20th, near the bright star Vega. It was then of ninth magnitude, and during the last week of the year became fainter.

Cometary Spectra.—An inclusive survey of our knowledge of the spectra of the heads of comets was published in 1929 by F. S. Hogg. Eight hundred and thirty observations on ninety-four comets, from 1864 to the present, were discussed. Cometary spectra are difficult to obtain, and to interpret when obtained, because the average comet is too faint an object to be observed well with the slit-spectroscope, and too diffuse to be observed well with the objective-prism. Also, comets differ greatly from one another in spectrum, and a single comet's spectrum varies strikingly as its distance from the sun changes. A well observed bright comet that approaches close to the sun shows a continuous spectrum with faint Fraunhofer lines, the reflected light of the sun, and also numerous bright lines or bands, most of which seem to be due to carbon and its compounds with hydrogen and nitrogen, but sodium lines and, in the great comet of 1882, iron, nickel, and perhaps chromium lines have been seen also. A number of other bright lines and bands of unknown origin occur; many of these are considered by Hogg as not real, but effects of the contrast, on the small scale of cometary spectra, between the regions of the continuous spectrum where there are few faint Fraunhofer lines, and the regions where lines are many and dark. A comet far from the sun generally shows only the carbon, cyanogen, and hydrocarbon bands. Some of the difference of the spectra is of course because comets far from the sun are usually far from the earth and so observed under handicaps, but the reality of the main changes is strikingly shown by Hogg's tables and graphs. He discusses the material which we would expect to be present in a comet's head, if the composition of meteorites is any guide, and its probable state of excitation under the sun's rays, and obtains results generally consistent with observation. He constructs theoretical comet-models, and compares their behavior, under specific conditions, with observation, and discusses finally what should be looked for in the spectra of the heads of bright future comets.

Brightness of Comets.—N. T. Bobrovnikoff has contributed a study of the brightness of the comets and their dependence on frequency of approach to the sun. He concludes that the more often a comet comes near to the sun the fainter it is, which is what we should expect, since the action of the sun appears to send off the comet's substance into space in the form of the tail. Bobrovnikoff estimates that the rate of disintegration is such that the system of the comets, if they form a single system, cannot be much more than a million years old, —very young, geologically speaking. There is much evidence of various sorts that the comets form a single system, not coming in to us individually from interstellar space, as was formerly held by many. It is thought likely, then, that the sun "picked up" the comets, perhaps from a cloud of nebular matter through which it passed, within astronomically recent times.

JUPITER

During the opposition of 1928-29, the surface of Jupiter exhibited unusual activity. In the south equatorial belt of the planet a complicated and rapidly changing series of small dark spots and streaks developed, with an average rotation period more than a minute longer than that of any other Jovian feature. There was also a striking bright region which, while inconspicuous near the center of the disc, was very prominent when near the limb, giving sometimes the impression of actually projecting slightly, an effect probably of irradiation. The famous Red Spot in the planet's southern hemisphere went through some interesting alterations, and changes in the color of it and of the belts were observed. The changes were followed visually by many observers, particularly in England and France, and fine series of photographs were obtained at Lick and Lowell Observatories in this country.

STELLAR PARALLAXES

The first ninety-eight parallaxes determined with the Yale telescope in South Africa were published in 1929. The measures appear to equal in precision the best determinations at northern observatories. Among the stars measured were Barnard's star and the three components of the system of Alpha Centauri, for which values were obtained in good accordance with other modern measures. But the parallax found for Betelgeuze was insensible, in contradiction to the value of one-sixtieth of a second which has been accepted hitherto. The northern observatories continue with their parallax measures; at the McCormick Observatory those for 956 stars have now been published.

Prof. H. N. Russell and Miss Moore have published parallaxes deduced from the orbital motions of 1777 double stars. The period of a double star depends on two things: the combined mass of the pair and their mean distance apart, or conversely, the true distance apart can be found from the observed or computed period if the mass can be guessed. But if the true distance apart is thus found, and the apparent one is measured on the sky, it is easy to compute how far the double star must be in order that its true distance should have the measured apparent value. The mass must be guessed from the brightness and color; fortunately these seem to be quite closely connected with the mass, and fortunately stellar masses do not appear to be very unequal. The period may sometimes be observed, but more often must be guessed, from the rate at which the stars turn round one another. So the results of this method are subject to large uncertainties in individual cases, like spectroscopic parallaxes, and indeed the smaller direct trigonometric ones, but for statistical purposes they are of much value.

STELLAR SPECTROSCOPY

In the last few years emphasis in the study of stellar spectra has been shifting noticeably away from the determination of general spectral classes and radial velocities for large numbers of stars and toward the detailed study of the individual lines of the spectra of a few stars. One of the chief influences in this direction has been the practical completion of the general surveys of the brighter stars, so that spectral classes are known down to nearly ninth magnitude, and radial velocities to about the naked eye limit. Any appreciable extension of these limits will require the inclusion of immensely greater numbers of stars, and the use of more powerful instruments than those heretofore employed. The other chief influence is the recent advance in theoretical study of the production of spectral lines, the same advance that has had so great an effect on solar spectroscopy. To the spectra of the brightest stars it is now possible to apply methods of analysis similar to those used on the sun's spectrum, and to compare the observed intensities of lines, and the gradation of intensity in a single line from its center to its edge, with hypothetical intensities and gradations calculated for stars of assumed constitution and state. Work of this kind is still in the experimental stage, and progress in it in 1929 did not result in the publication of extensive results, but in almost all of the American observatories which have worked extensively on spectra, photographs previously taken for spectral classification of stars and for their radial velocities are now being analyzed quantitatively with the registering microphotometer to obtain the physical state,—temperature, pressure, composition and degree of ionization—of the atmospheres of these stars.

GROUPS OF UNIVERSES

The great system of the stars, within which the sun is situated, has a flattened, somewhat discoid shape, of the vast numbers of non-galactic nebulæ—those which do not seem to be connected with our stellar system—most of the better observed ones have also a flattened shape; they also exhibit spectra such as might be given by great clusters of distant stars. There has long been an opinion, which has gained much acceptance of late, that our stellar system is one, perhaps the largest, of these nebulæ. It has long been well-known also that the non-galactic nebulæ are much more numerous in some directions than in others. They are most noticeably crowded in the region near the north pole of the Milky Way, roughly bounded by the quadrilateral at whose corners are the stars Arcturus, Spica, Regulus and Cor Caroli. Near the center of this region, on photographs covering a little more than a hundred square degrees, study at Harvard Observatory has revealed 2,775 nebulæ from the tenth to the eighteenth magnitudes.

There is considerable evidence for the supposition that nebulæ of this type are great clouds of stars (see below, for instance), and that the actual brightness of one of them is of the order of a hundred million times the sun's. If this is so, the distances of the fainter ones are above ten million light-years. The Harvard studies indicate, moreover, that the nebulæ are grouped into several distinct clusters, the brightest and presumably nearest containing more than a hundred nebulæ. This "super-system" is probably about seven million light-years away and perhaps a million light-years across. Behind this group there seem to be at least three and perhaps five other groups.

A by-product of the investigation is a strengthening of the evidence for the transparency of space. Though the work of Plaskett, Struve, and others has made it very probable that interstellar regions contain "wandering atoms" of gas, especially of calcium, in great numbers, they form so excessively rarefied a medium that the radiation that streams back and forth is not appreciably dimmed. If it were dimmed, the more distant nebulæ should appear unusually faint for their size; but comparison of the magnitudes and the diameters of the nebulæ in the region investigated does not show any such effect.

Another fainter group of nebulæ, to the northeast of the region investigated at Harvard, has been studied by Dr. Hubble, of Mt. Wilson Observatory. He finds this group to be about seven times as far as the nearest of the other "super-systems," or some fifty million light-years away. In size it seems to be not greatly different from the other.

A UNIVERSE FROM OUTSIDE

The detailed study of the great spiral nebula M 33, published some years ago by Dr. Hubble, made it appear highly probable that the nebula is a stellar system not greatly dissimilar to that of which the sun is a humble member. An investigation by Hubble of another great spiral, the famous nebula M 31 in Andromeda, appeared in 1929. This is the most conspicuous of all the non-galactic nebulæ, the only one visible to the naked eye. To ordinary telescopic examination it is a very disappointing object, showing only the vaguest traces of structure in its soft cloudy oval. But by the photographic telescopes of to-day an extraordinary complication of detail is revealed. There is a bright irresolvable nucleus, from which extend two spiral arms of very intricate structure, closely coiled around the nucleus. Toward the ends the arms can be seen to be composed, at least in part, of swarms of faint stars, down to the twentieth magnitude. Among these were found forty variable stars of the Cepheid type. Now the real brightnesses of Cepheids have been found to be lineally related to their periods of variation, so that the real brightnesses of the Cepheids in the nebula could be found by comparing their periods with those of Cepheids in our own system. From the real and apparent brightnesses the distance of the nebula was calculated to be around nine hundred thousand light-years, or nearly the same as that of M 33. The apparent luminosities of the brightest non-variable stars, when compared with those of the brightest stars in our system, seemed to be consistent with this distance, as did also the brightnesses of eighty-five Novæ or "new stars," which have appeared in the nebula. The diameter of the nebula is in the neighborhood of twenty thousand light-years. It is known to be in rotation, and the speed of the rotation leads to a very rough estimate of the mass of the material in the nebula as about equal to one sun like our own in every six hundred cubic light-years. Investigations of the radial velocities of stars in different directions and at different distances, made in recent years, seem to show a definite rotation of our own stellar system; the result of the latest of these studies was announced from the Astrophysical Observatory of the Dominion of Canada last summer. Comparison of the rotations suggests that in our stellar system the stars are not as close together as in the Andromeda nebula. And so far as we can make out the arrangement of the stars around us, our system is much larger and more irregular in form than the nebula.

PRIZE AWARDS

Janssen Medal.—Dr. William H. Wright, of the Lick Observatory, has been awarded the Janssen medal of the Paris Academy of Sciences, for his photographic study of the surfaces of the planets.

The Bruce Medal, of the Astronomical Society of the Pacific, has been awarded to Dr. Frank Schlesinger, Director of the Observatory of Yale University, in recognition of his work in stellar photography and stellar parallaxes and proper-motions.

Dr. Paul W. Merrill, of the Mount Wilson Observatory, has been elected to membership in the National Academy of Sciences.

Menzel-Gerasimovic Award. — A Morrison Prize was awarded to a paper on "The Sources of Stellar Energy," written by Dr. D. H. Menzel, of Lick Observatory, and Dr. P. B.

Gerasimovic, of Harvard College Observatory.

NECROLOGY

Garrett P. Serviss.—It seems fitting to note in these columns the passing of two who, while not professional astronomers, were figures of influence for many years in American astronomy. Garrett P. Serviss, writer and lecturer of charm, inspirer the country over of amateur astronomers, many of whom carried over into professional observatory work the enthusiasm fanned by his tongue and pen, died May 24.

Worcester R. Warner, partner in the firm which built many of the world's greatest telescopes and the domes that cover them, keenly interested and helpful friend of astronomy, died June 25.

BIBLIOGRAPHY

Books.—There are many excellent works now in print which present astronomy to the general reader. Two published in America this year are *Our Wonderful Universe*, by Professor C. A. Chant of Toronto (New York: World Book Company), and *The Pageant of the Stars*, by Professor W. J. Luyten of Harvard (New York: Doubleday-Doran). Both are well written and up-to-date; the former perhaps appealing more to younger readers. Two others published in England deserve special mention, *The Universe Around Us* and *Eos, or the Future of Cosmogony,* both by Sir James Jeans. Sir James is at the same time one of the most eminent living mathematical astronomers and one of the most fascinating speakers and writers upon the popular aspects of astronomy, and these volumes have all the authority and charm that we have come to expect from his pen.

Journals.—American observatories either maintain publications of their own, or publish their researches in such technical journals as *The Astronomical Journal* and *The Astrophysical Journals;* but summaries of their work appear each year in *Popular Astronomy* (Northfield, Minn.), which prints also abstracts of the papers read before the American Astronomical Society and reports of the amateur organizations. Pacific coast observatories and organizations publish also in the *Publications of the Astronomical Society of the Pacific* (San Francisco), and Canadian, in the *Journal of the Royal Astronomical Society of Canada.*

COGNATE SOCIETIES

AMERICAN ASSN. FOR THE ADVANCEMENT OF SCIENCE, Smithsonian Institution Bldg., Washington, D. C.
AMERICAN ASTRONOMICAL SOCIETY, University Observatory, Princeton, N. J.
AMERICAN MATHEMATICAL SOCIETY, 501 W. 116th St., New York City.
MATHEMATICAL ASSN. OF AMERICA, Oberlin, O.
NATIONAL ACADEMY OF SCIENCES, B and 21st Sts., Washington, D. C.
SCIENCE SERVICE, 21st & B Sts., Washington, D. C.

DIVISION XIX

ENGINEERING AND CONSTRUCTION

STRUCTURAL ENGINEERING

By Milo S. Ketchum

Dean, College of Engineering, University of Illinois

BRIDGES

State Ownership of Toll Bridges.—State ownership of all toll bridges, including the acquisition of existing privately owned bridges, was established as a policy of California in a series of bills signed by the Governor June 10, 1929. The California Toll Bridge Authority is established and is authorized to direct the Department of Public Works to build toll bridges and to acquire existing bridges by purchase or by eminent domain proceedings. Authority is given to issue bonds that are secured solely by the revenue of certain bridges. Rates of toll are to be fixed at an amount that will retire the bonds in a reasonable time and give toll-free bridges.

The first 2-in. cable of the two groups of nine cables each for each of the two footbridges of the Hudson River Bridge at New York was strung on July 9, 1929. The four 36-in. main cables will be spun from the temporary foot-bridges.

Eyebar Suspension Bridge of Novel Type.—The suspension bridge over the Ohio River between Point Pleasant, W. Va., and Gallipolis, O., has heat treated eyebar chains, portions of which form the upper chords of the stiffening trusses. This is the first bridge of this type built in the United States. The bridge has a 700-ft. center span and side spans of 380 ft., and a 22-ft. roadway and a 5-ft. sidewalk between stiffening trusses. The bridge was designed for American Society of Civil Engineers H.15 loading. The anchorage at each end of the bridge consists of a reinforced concrete trough 200 ft. long by 34 ft. wide, filled with earth and reinforced concrete and supported on 405 16-in. reinforced concrete piles. The cable pull is resisted by the weight of the anchorage and shear strength of the piles. The eyebars are heat-treated carbon steel having an ultimate strength of 105,000 lbs., an elastic limit of 75,000 lbs., and are proportioned for a working stress of 50,000 lb. per sq. in.

Steel Arch Over Ohio River at Pittsburgh.—The steel bridge now being erected over the Ohio River to take the place of the old chain suspension bridge known as the Point Bridge contains an 800-ft. arch span. The main channel span is an 800 ft. arch of the Hell Gate type. It is flanked by four spandrel-braced arches of about 340 ft. span and nine deck trusses 160-ft. span. The bridge has a 40-ft. roadway and two 6-ft. sidewalks. The total cost of the bridge will be $1,900,000.

Cantilever Bridge Opened.—The cantilever steel bridge with a total length of 14,313 ft., including a cantilever span of 1,050 across Cooper River, at Charleston, S. C., was formally opened Nov. 9, 1929. It has a maximum clearance of 160 ft., and the roadway is 20 ft. curb to curb, and is widened on curves. The total cost of the bridge was $6,000,000. The bridge was designed by Waddell & Hardesty, consulting engineers.

Continuous Truss Bridge.—The continuous truss bridge constructed by the Chesapeake and Ohio Railway at Cincinnati is one of the heaviest and longest continuous truss bridges in existence. The structure is a double track E70 silicon steel continuous truss bridge 1,575 ft. long center to center of end bearings with a center span of 675 ft. and two side spans of 450 ft. The foundations were sunk by open dredging and were covered over and subjected to air pressure only, in order to clean out the working chamber and permit inspection of the foundation bed. The bridge was erected with locomotive cranes. The center span was erected by the cantilever method from both ends to the center.

A combined railway and highway bridge of the continuous type is now being built over the Missouri River at St. Joseph by the St. Joseph and Grand Island Railway. The bridge has continuous trusses 900 ft. long with clear spans of 450 ft. The continuous truss bridge showed a saving of $25,500 ($13,000 in the superstructure and $12,500 in the substructure) over the cost of two simple spans. This is 7 per cent of the total cost of the bridge. A comparison of the cost of carbon steel and silicon steel showed a saving of $37,000 by the use of silicon steel wherever the size of members would justify it. The silicon steel cost 0.7c. per pound more than bids for carbon steel on all on a design using this material. Unit stresses were on carbon steel, 16,000 lb. tension and 15,000 minus 50 1/r lb. compression with a maximum of 13,500 lb. per sq. in.; silicon steel 24,000 lb. tension and 22,500 minus 75 1/r lb. compression with a maximum of 18,750 lb. per sq. in. The highway roadway has a width of 27 ft., there being no sidewalks. The highway roadway has a 6¼ inch reinforced concrete floor slab carried on steel beams spaced 3 ft. 3 in. centers.

Prize Bridge in 1928.—The prize given by the American Institute of Steel Construction for the most artistic steel bridge erected in 1928 has been awarded for the self-anchored suspension bridge over the Allegheny River at Sixth Street, Pittsburgh. The designs of the bridge were prepared by the Engineering Department of Public Works of Allegheny County, of which Norman F. Brown is director and C. M. Reppert is assistant director. Designs were prepared by V. R. Covill, chief engineer of bridges, C. J. Wilkerson, consulting engineer, and A. D. Miller, engineer of bridge design.

Failure of Wire Rope Cables.—The discovery February, 1929, of breaks in the wires of the main cables of the nearly completed Mount Hope suspension bridge near Bristol, R. I., and the subsequent finding of additional breaks caused the owners of the bridge to replace the cables with others of approved quality. It is a private toll bridge with a central span of 1,200 ft. Each of the two 11-in. cables contains seven strands of 350 No. 6 heat-treated galvanized wire (used also in the Ambassador Bridge over the Detroit River at Detroit), which differs only slightly from ordinary cold drawn wire in ultimate strength but has a yield point of 85 per cent of the ultimate in place of 65 per cent of the ultimate for ordinary wire. At the time that the first breaks were discovered, the wires were stressed to about 32,000 lb. per sq. in. as compared with working stresses of 80,000 lb. per sq. in. when the bridge was completed. No breaks were observed during spinning or erection. The largest number of breaks occurred near the ends of the cables, the majority of the breaks being near the tangent point of the shoe. These were observed after erection.

A few breaks were also found on the Ambassador Bridge, at Detroit, but these were not considered significant until the breaks were discovered at Mount Hope. The Ambassador Bridge has two cables, each of 37 strands of 206 No. 6 heat-treated and galvanized wires furnished by the same plant under the same specifications as the heat-treated wires for the Mount Hope Bridge. The breaks occurred at an actual stress of 10,000 lb. per sq. in. as compared with a working stress of 84,000 lb. per sq. in. On the recommendation of the consulting engineers, Modjeski & Cone, the owners of the Ambassador Bridge ordered the cables replaced by cables made of standard cold drawn wire.

The last beam of the Ambassador Bridge was set Sept. 16 and the bridge was formally opened Nov. 11, 1929, nine months before the contract time for completion. The Mount Hope Bridge was completed the latter part of October and has been formally opened for traffic. The U. S. Bureau of Standards in Washington, with the coöperation of the consulting engineers and the owners of both bridges and the makers of the heat-treated wire, are carrying on an exhaustive research on the properties of heat-treated wire. No results have yet been announced.

The Memphis Bridge.—The damage to the steelwork of the Memphis Bridge, caused by the burning of the wood floor, has been made good without dismantling the structure. The bridge is a combined railroad and highway structure with the timber roadway and railroad deck placed 10 ft. above the bottom chords of the through spans. While the entire floor system was so warped and twisted as to lose all resemblance to a floor system, the main truss members remained comparatively unharmed. The only perceptible damage to these members was the buckling of one web of the upstream bottom chord in three different sections, one in each of the cantilever arms and one near the center of the suspended span. The camber in the bridge was not changed by the fire which indicated that the fire did not cause sufficient damage to endanger the span. The tests of specimens cut from the damaged plates, which were Marjari steel, showed that the steel was not weakened or damaged. The bridge was repaired by replacing 27 panels of the damaged floor system and traffic was allowed to cross on the lower track. Later, the three damaged lower chord sections were repaired by cutting out the damaged plates and sections and replacing them with silicon plates and sections of equal strength. The new pieces of web were riveted at one end and at the other end of the splice the holes which were 3/16 in. short were brought together by means of drift bolts. When the buckled members were cut out, the members pulled apart even though stress normally was compression in the bottom chord of the cantilever arm. The buckling of the webs had caused a tension of 420 tons in place of a dead load compression of 330 tons.

Deep Bridge Foundations.—The foundations for the piers for the new bridge across the Mississippi River at Vicksburg have been sunk to the unusual depth of 110 ft. below water. Several of the caissons required air pressure of 52 lb. per sq. in. During the sinking there were no deaths due to working in the high air pressures and but one case of permanent disability. The depths of the piers and the pressures in sinking these piers exceed the depths of the piers and the pressures used in sinking the piers for the Eads Bridge over the Mississippi at St. Louis, Missouri, which has held the record for the pneumatic system for over fifty years. Deep piers extending to 97 ft. below the water surface have been sunk by the open caisson process for the Lake Champlain bridge between Crown Point Park, N. Y., and Chimney Point, Vt. Spliced sheet steel piles 98 ft. long were driven in deep water through mud and clay to a depth of 97 ft. below the water surface. The cofferdams were braced by sliding steel bracing dropped as excavation proceeded. The material was excavated by clamshell dredges and by pumping. Concrete placed with bottom dump buckets sealed the cofferdams 97 ft. below the lake in six-day continuous pours.

BUILDINGS

High Building Construction.—Steel office buildings are rapidly increasing in height and size. The height of reinforced concrete buildings has been limited by the size of the columns in the lower stories. The use of cast iron cores or structural steel cores in reinforced concrete columns, and the use of structural steel columns for tower columns as in a recent reinforced concrete building in Chicago, have greatly increased the economical height of reinforced concrete buildings. Structural steel and reinforced concrete are not properly competitive materials but should be used in combination so as to obtain the best and most economical structure.

Steel and Concrete Framing in Tall Buildings.—A combination of reinforced concrete, structural steel, and cast iron, is employed in the framework of the 30-story Trustee System building now under construction in Chicago. The building is 80 by 150 ft. and rises 337½ ft. from the sidewalk. The foundations are concrete piers on hardpan 81½ ft. below street grade. Column design includes structural steel with concrete fireproofing, ordinary reinforced concrete and Emperger reinforced columns with cast iron cores. In the lower stories, the columns are from 36 by 36 in. to 32 by 32 in., reducing to 28 by 28 in. in the 20th floor; and smaller sizes in the upper stories. Where cast iron columns were used, their diameters range from 12¾ to 3½ in. Six columns under the tower are of structural steel to the 21st floor and two others to the tenth floor. Of the six columns, two are wall columns, four are interior columns. The floor framing to these columns is also of structural steel. Floor framing for the reinforced concrete columns is of reinforced concrete. The architects are Thielbar and Fugard, with James B. Black as structural engineer.

Cast Iron Cores Used in Columns.—The McGraw-Hill building, in Chicago, has composite concrete columns with cast iron cores. The composite columns, known as the Emperger type, permit of a relatively small cross-section. The core is supplemented by the usual vertical bars and spiral reinforcement. The columns are uniformly 24 by 24 in. or 26 by 26 in. for those of the elevator group. The column sizes are maintained for the entire height, the reduction in strength from bottom to the top being made by reducing the cast-iron cores. The cores are solid cylinders of cast-iron with ends milled. The cores vary from 11 in. in diameter at the bottom to 3 in. in diameter at the top.

Tests of Large Steel Columns.—Tests of eight steel columns made of three grades of structural steel as used in the Hudson River suspension bridge and the von Kill bridge have been made by the U. S. Bureau of Standards. Six of the columns were dimensionally one-half size specimens of the base columns in the Hudson River bridge, and the remaining two sections were similarly proportioned models of lower chord sections of the von Kill bridge. The material used in the Hudson River bridge was ordinary structural steel, silicon steel with an ultimate strength of 80,000 to 95,000 lb. per sq. in. and an elastic limit of 45,000 lb. per sq. in., and a new grade of structural steel known as carbon-manganese with an ultimate strength of 90,000 to 95,000 lb. per sq. in. and an elastic limit of 55,000 lb. per sq. in. Two column sections were made of each grade of material. The two von Kill lower-chord sections were also of the carbon-manganese structural steel grade. All column sections contained cross-sections of 144 sq. in. or more metal, and were tested in the 10,000,000 lb. testing machine at the Bureau of Standards in Washington. Standard mill tests were made for each different thickness and plates used in the fabrication of the test columns. The short 1/r ratio of the columns and their box section did not permit any marked deflections until the column was at the point of failure. The final report of the tests has not been prepared but the following observations of the tests will be of interest. The ultimate strengths of the two test columns in percentages of the weighted yield point of the steel in the columns are as follows: For Hudson River bridge, carbon steel 83.6 and 83.3 per cent; silicon steel 96.2 and 96.5 per cent; carbon-manganese steel 103.9 and 105.1 per cent. For the von Kill bridge, carbon-manganese steel, 99.0 and 98.4 per cent. The tests of this investigation have been of decided value to the bridge department of the Port of New York Authority. They have vindicated the use of silicon steel and the box-section column for the tower columns of the Hudson River Bridge, giving assurance of the strength of these columns, and they have shown a weakness in detail design of some of the lower chord sections of the von Kill bridge, which has permitted a redesign of these members so as to secure maximum efficiency of the section. These tests are of great value, as they give valuable data on the strengths of large fabricated columns and on the efficiency of specific types of sections as compression members, give direct comparison of three grades of structural steel, and give additional information on the strength of wide plates under compression.

Welding for Structural Steel Buildings.—During the past year, several important structures with welded connections have been constructed. These structures include mill and office buildings of considerable size and many other miscellaneous structures, but do not include any highway or railroad bridges. While electric arc-welding has been used for the greater part, gas welding has been successfully used, notably on a large steel mill building. Considerable progress has been made during the year in increasing our knowledge of the strength and properties of welds and methods of determining the quality of welds in structures. Tentative specifications have been proposed for the construction of arc-welded buildings. Structural engineers should use such specifications with great caution as our present knowledge of the art of welding and the action of welded structures under stress is not sufficient to permit the preparation of specifications that will result in safe structures. Exhaustive and expensive researches will be necessary before engineers will be able to design steel structures with welded joints with the same certainty of performance as for structures with riveted connections.

Wind Stresses in Buildings.—More than twenty-five years ago, the writer stated that for resisting wind stresses, stiffness and rigidity were more important than great strength in designing buildings to resist wind loads. The failure of the buildings at Miami as found by a committee of engineers, and observations by the writer in the tornado zone in southern Illinois, showed that destruction of buildings was in inverse ratio to the stiffness of the structure. In designing the framework of the Consolidated Gas Building in New York to carry wind loads, stiffness of the structure rather than strength of wind bracing was given first consideration.

New Alloy Structural Steel.—Ornamental metal work in the new Chrysler Building in New York is to be of Nirosta Steel, a new alloy produced by the Ludlum Steel Company, Watervliet, N. Y., under patent rights obtained from the Krupp Works of Essen. It is claimed that the new metal is stronger than other steels and that it has a finish resembling platinum that will preserve its luster on exposure to gas, smoke, and other atmospheric conditions. A chrome nickel steel known as Allegheny metal, also said to be noncorrosive, was used on the bridge of the Daily News Building, in Chicago. Holabird & Root were the architects for the Daily News Building.

Corrosion Tests of Steel.—Tests carried on by a committee of the American Society for Testing Materials shows that copper-bearing steel resists corrosion due to atmospheric exposures much better than non-copper-bearing steel. Immersion tests do not show an advantage for the copper-bearing steel. Tests reported to the American Society for Testing Materials show that corrosion greatly reduces the fatigue strength of steel.

Light-weight Structural Shapes.—Light-weight structural shapes are now being rolled by the United States Aluminum Company, Pittsburgh. Aluminum structural shapes of angles, channels, and I-beams, up to 14-in. section and 85 ft. long, and plate in larger sizes, are now commercially rolled. The company has built a 10-ton bridge crane of aluminum alloy for use in its rolling mill. The saving in weight by using aluminum alloy over a standard steel crane was 50 per cent. This new structural material should find many uses.

AIRSHIP DOCK

The Goodyear-Zeppelin airship dock and factory at Akron, O., the largest airdock in the world, has recently been completed. The body of the building is a semi-ellipsoid formed by a series of thirteen three-hinged arches of 325 ft. span and 198½ high to the center pins. It is enclosed at the ends by special doors, which, when shut, form quadrants of spheres. The doors are also made of arch trusses carried on a single pin at the apex of the roof and resting on railroad tracks on the ground. The total length of the building, including doors, is 1,184 ft. 4½ in.; the doors take up 109 ft. 2¼ in. of this length at either end. The body of the building has ten bays of 80 ft. and two bays of 83 ft. The structure contains 7,000 tons of structural steel, 1,300 concrete piles, and 10,000 cu. yds. of concrete. The floor area is 364,000 sq. ft., and the cubic contents are 45,000,000 cu. ft. The principal axis of the building is placed parallel to the direction of the prevailing winds during flying weather. This airship dock exceeds in size any other airship dock in the world. There are only two airship docks in the United States, the navy hangar at Lakehurst, N. J.; and the army hangar at Belleville, Illinois. The former is the home of the *Los Angeles*, at present the largest dirigible owned by the United States. The hangar has a length of 803 ft., a width of 264 ft., and a height of 172 ft. to the center of the upper pin. The hangar at Belleville has a length of 810 ft., a span of 150 ft., and a height of 150 ft. The airship dock at Karachi, India, is 850 ft. long, 230 ft. wide and 170 ft. high. The reinforced concrete hangars at Orly, France, have a length of 984 ft., a span of 298 ft., and a height of 194½ ft. The main framework of the structure was designed for a dead load of 30 lb. per sq. ft. horizontal projection. No snow load was assumed to act in combination with the dead loads, but a snow load of 15 lb. per sq. ft. was combined with the wind loads. A wind load of 37½ lb. per sq. ft. on a vertical surface was combined with an internal wind pressure of 12½ lb. per sq. ft. A direct horizontal wind load of 15 lb. per sq. ft. with no internal wind pressures was also used as a check. All the steel is of structural grade except the chords of the main arches which are of silicon steel. For dead and snow loads, working stresses were 18,000 lb. per sq. in. on structural steel grade and 24,000 lb. per sq. in. on silicon steel. For wind, 24,000 and 32,000 lb. per sq. in. were used on structural grade and silicon steel, respectively.

CONCRETE ARCHES AND DAMS

Tests of Reinforced Concrete Arches.—The research investigations of Professor W. M. Wilson at the University of Illinois and Mr. S. B. Slack's observations on 160 ft. span reinforced concrete arch in Putnam County, near Eatonton, Georgia, have added much to our knowledge of the action of such structures when under stress. The most important results that affect arch design that have resulted from research investigations during the past two or three years are the following: First, deformations of the piers, especially where the piers are high, affect the strength of the arch. Footing yields are often an important factor to be considered in arch design. Second, the entire arch, including arch rib and the spandrel bracing, must be considered as a unit in calculating the stresses in and in designing a reinforced concrete bridge. Failure to do this is both uneconomical and dangerous. Third, the effect of chemical and setting stresses during and after erection and the effect of temperature stresses during erection have been tentatively solved as the result of Mr. Slack's tests on the Georgia arch, in which he found that it was possible to reduce the abnormal temperature effect by jacking up during construction and by late keying of the arch. The study of the flow of concrete under stress now being made by the committee on Concrete and Reinforced Concrete Arches of the American Society of Civil Engineers gives promise of adding greatly to our knowledge of the action of concrete structure in load.

Boulder Dam.—An additional height of 25 ft., making a total above bedrock of 725 ft., is being considered by the U. S. Bureau of Reclamation. The increased height will add

30,000 acre-ft. to the water being impounded by the dam. Dr. H. M. Westergaard, Professor of Applied Mechanics at the University of Illinois, has been given a year's leave of absence to assist the engineer of the U. S. Bureau of Reclamation in the investigation of the design of the Boulder Dam.

Stony Gorge Dam.—The Stony Creek dam recently completed on the Orlando irrigation project of the U. S. Reclamation Service is a reinforced concrete dam of the Ambursen type. The dam is 125 ft. high above stream bed and 868 ft. long. The ogee face slab on the downstream side of the spillway terminates in a concrete apron which extends 50 ft. below the dam for stream bed protection. The dam contains approximately 50,000 cu. yd. of concrete and 1,000 tons of reinforcing steel. The total cost was $967,000.

Large Reinforced Concrete Arch Dam.—A thin-section concrete overfall dam 230 ft. high, with its downstream toe protected by a deep cushion pool formed by a 40 ft. gravity dam a short distance downstream, is being constructed at Calderwood, Tenn., by the Aluminum Company of America. The dam has a height of 230 ft., a downstream radius at the crest of 312.5 ft. From the crest for a distance downward of 45 ft., the rings are of constant radius as well as a constant radial thickness of 25 ft. From this point downwards the crown thickness increases and the radius decreases to a minimum. The arch ring in this section also increases in thickness from the crown to the abutment. Provisions are being made in constructing the dam for a complete test of the structure under service conditions. The cushion pool will have a minimum depth of 35 ft. and a maximum depth of 65 ft. during full flood.

TUNNELS

Detroit-Canada Vehicular Tunnel.—The tunnel under the Detroit River between Detroit and Windsor is the third great subaqueous vehicular roadway. The others are the Holland Tunnel and the George A. Posey tube under the estuary between Oakland and Alameda, Calif. From portal to portal, the length of the tunnel is 5,135 ft. A 22-ft. roadway with 13½-ft. headroom is provided, although two 14-ft. roadways are provided on the approach on the American side. The estimated capacity is 1,000 cars per hour in either direction. The tunnel is divided into seven sections representing four different types of tunnel. At either end there is an open cut incline leading to the portals. From the portals to the ventilation towers the approach tunnel sections are of the conventional box-type cross-section with steel bents joined by concrete jack arches constructed by the cut-and-cover method. From the ventilation buildings to the harbor line, the tunnel is being driven by a shield, the largest yet used, while in the subaqueous section the tunnel is made up of preformed segments of structural steel lined and incased with concrete and sunk in a prepared trench on the river bottom. The 32-ft. shield-driven tunnel is not only larger than any other attempted but will use a lining of structural steel in place of the previously used cast-iron segments. The steel lining weighs 2.3 tons per lineal ft. of tunnel in place of 8 tons for cast-iron. The liners are 2½ ft. wide and 9 ft. long and are 9 or 10 in. deep, made of ⅜-in. pressed steel. The ends of the plans are closed with a ⅜-in. plate. Stiffeners of 5-in. 14¾ I-beams are welded on 13-in. centers across the narrow dimension of the liner to take the thrust of the jacks. The liners are completely fabricated by arc welding. Each segment weighs 1,000 lb., and eleven segments and a key comprise a complete ring of lining. The subaqueous section is divided into nine sections, one section 220 ft. long and eight sections 248 ft. long, a total length of 2,204 ft. The steel shells are 31 ft. in diameter and are made of ⅜-in. steel plate. Outside diaphragms made of angles and 5/16-in. steel plate are placed at 12-ft. intervals. The shell is stiffened on the inside with angles placed circumferentially on ft. centers longitudinally. The outstanding legs of the angles are punched on 12 in. centers with holes through which reinforcing steel is placed to reinforce the concrete lining. The concrete lining is 19 in. thick, fully reinforced. The sections are bulkheaded at the end and are sunk in place from barges. After the sections are in place, concrete around the tunnel will be placed by means of a tremie. Ventilation has been based on data secured for the Holland Tunnel and on the George A. Posey Tunnel in California. It is estimated that 1,000,000 cu. ft. of air will be required per minute under maximum operating conditions with a complete change of air each 1½ minutes. To date, six of the river sections have been sunk. Completion of the entire work is expected late in 1930.

MECHANICAL ENGINEERING

By Calvin W. Rice
Secretary, American Society of Mechanical Engineers
and
By Leon Cammen
Associate Editor, *Mechanical Engineering*

INTRODUCTORY

It was stated at the beginning of the report on mechanical engineering in The American Year Book for 1928, that mechanical engineering has reached the state where progress each year is inevitable. This, among other things, is due to the fact that we are beginning to know in many cases just how things happen, although we have not yet reached the stage where we can tell why. In the field of lubrication (shown by the work of Woog, Trillat, and others who followed the path opened some years ago by Irving Langmuir) where we formerly knew that certain kinds of oils make good lubricants and others do not, we are now beginning to understand the electro-magnetic mechanism which makes oils and metals in contact with them behave as they do. That we are working on the right track in this field is indicated, among other things, by two facts: first, that a close connection is in process of being established between laws governing the behavior of materials and mechanism and, for example, those whose action is expressed in geologic formations; second, that, as we learn more and more about the behavior of materials, we are finding to an increasing extent how little we really know about it and how sketchy our knowledge is where a few years ago we thought we knew everything there was to know.

The path-breaking work of the physicists, such as Einstein, Heisenberg, Schroedinger and others, has not yet effected to any material extent the practice of engineering and is not likely to do so soon. Even according to the relativity theory as expressed by Einstein and his followers, the corrections which this theory introduces, while applicable to the universe, are not sufficiently large in the case of the phenomenon in which the mechanical engineer deals to affect the working of his formulæ. Nevertheless engineers are more and more appreciating the tremendous possibilities dormant in physical concepts under which the electron becomes a kind of a cross between a particle and a pure wave motion; where the law of cause and effect seems to be but a partial application of the law of probability, and time is even more relative than shape; where a square is either not a square at all or must be drawn with two sides longer in order to be a square, and if so drawn ceases to be a square when turned through an angle of 90 degrees; where fourth dimension is becoming a more and more accepted fact, and a suspicion that even a fifth dimension may have a physical meaning attacks the physicists.

Engineers are taught physics presumably because they need this particular branch of knowledge in their business. If an engineer with the knowledge of modern progress took the text book which he used ten years ago in college, the one thing that would strike him more than anything else would be how apparently wrong every general statement in that text book turns out to be. In a way this is a disturbing situation. From another point of view, there is a germ of tremendous progress in the new, broader and apparently truer conceptions of the nature of the physical universe.

In the present report use has been made of Progress Reports presented by some of the Professional Divisions of the National Engineering Societies represented on the Advisory Board of THE AMERICAN YEAR BOOK.

STEAM

Temperature and Pressure.—The efficiency of steam apparatus depends on our knowledge of the properties of this peculiar fluid, as without such knowledge we cannot design steam machinery, such as turbines, to give the proper output for a given dimensioning of parts, distribution of temperatures, etc. Such determinations of the properties of steam are difficult, particularly when we have to work with steam at high temperatures and pressures, and the development of modern engineering has brought us well within the highest regions of both temperature and pressure, and in addition requires unusual precision in steam characteristics all over the table. From this point of view the publication of extended tables of steam by Prof. H. L. Callendar in England, and of tables of specific heat of steam at pressures of from 30 to 120 atmosphere and from saturation temperature to 450 deg. cent. by Oskar Knoblauch and W. Koch in Germany becomes a matter of note. Work of an important character along the same line is being also carried on in this country.

Fuel Power and Efficiency.—The changes in the electric utilities have been striking. The business of the utilities has grown by leaps and bounds like a sum at interest compounding at the rate of 10 per cent. In the last 25 years the total production of electric power by central stations and electric railways has increased nineteenfold. Part of the increase is due to the development of hydro power; but the production of fuel power has risen from 4,000,000 kw-hr. in 1902 to about 52,000,000,000 in 1928, an increase of thirteenfold. The consumption of coal has increased during the same period, but in much smaller ratio. In 1902 the utilities used, in round numbers, 11,000,000 tons; in 1928 they used 41,000,000, an increase of less than fourfold against the thirteenfold increase in power production. This astonishing result has been made possible by improvements in fuel efficiency. In 1902 the average consumption per kilowatt-hour was about 6.6 lb. By 1917 this had been cut to 3.3 lb. Particularly rapid progress has been made since the war, and in 1927 the average fell to 1.83 lb. Even this is much above the performance of the best plants to-day, and one station on the Ohio River below Cincinnati has touched a record of 0.86 lb. per kw-hr. generated.

FUEL UTILIZATION

Improved Methods.—In the past year a movement of the utmost importance, which started many years ago, has come to a head. We refer to improved methods of fuel utilization. The idea is not new but it is only quite lately that its economic importance on a national, perhaps international, scale has been fully recognized. Until a few years ago, the major part of all fuels consumed in industrial operations were used essentially in the form in which they were obtained from nature. It was only in a few instances that modified fuels were employed and, where this was done, only the crudest methods of modification were employed. First, blast furnaces were fed with coke, which was essentially a residue of certain coals from which the volatile constituents have been driven away. Automobile engines were fueled with gasoline obtained by fractional distillation of the crude oil or by condensation of the gasoline vapors in casing-head gases. The shortage of gasoline some ten years ago led to a development of the cracking process which was the first attempt on a big scale to produce essentially a synthetic fuel, the heavier fractions of the crude oil being broken up under the action of pressure and temperature to form a lighter hydrocarbon.

Fuel Compounds.—Of late, however, the great wastefulness of burning natural fuels in ways where the efficiency was low and the waste high was broadly recognized by engineers. This led to work along substantially three different lines. One group attempted to break up soft coal by carbonization at low temperature. During this process the volatiles and tars were gradually driven off and collected in proper receptacles with the result that in addition to an effective solid fuel, a number of valuable by-products were obtained. For many of these by-products suitable markets have been already found or are in sight. The second line of research, initiated primarily by Doctor Bergius in Germany consisted in submitting coal to pressure in the presence of hydrogen gas and certain catalysts. In this way entirely new hydrocarbon compounds were built up, not originally present in the coal, with the result that in addition to the solid fuel and such usual by-products as sulphate of ammonia, a considerable amount of liquid fuel equivalent to gasoline was obtained. This process has been already developed to a large commercial scale in Germany and promises to be of great value to countries not blessed with large supplies of natural oil. The third development which took place within the past year has been the application of the Bergius hydrogenation process to oil in an apparent endeavor to produce something replacing cracking but working along a different and more active chemical cycle. This process, likewise developed in Germany, was first used in this country by the Standard Oil Company of New Jersey and has been already put to work on a big scale. The general understanding is that when it is developed fully other oil companies will be licensed to use it. No reliable data has been published as to this process and the products obtained thereby. Professor Hugel, of the Petroleum College of the University of Strassburg, conceived the idea of utilizing alkaline hydrates, such as sodium, potassium and calcium as catalyzers in the hydrogenation of tar pitch. He succeeded in this way in hydrogenating naphthalene and anthracene, which was formerly impossible because the sulphur in the pitch poisoned the usual catalyzers, such as nickel, copper and platinum.

In Australia the Electricity Commission of the State of Victoria succeeded in installing a plant capable of burning Yallourn brown coal, not an easy task as this coal contains more water (64 per cent) than combustible, and has a heating value of less than 4,000 B.t.u. per lb.

Pulverized coal is making further progress, not perhaps quite as much as some of its adherents expect. Although a great deal has been said and written about the possibilities of high rates of combustion of pulverized coal, the most practical rates are still between 1 and 2 lb. of coal per cu. ft. of total combustion space per hour, or, a rate of heat liberation of 12,000 to 25,000 B.t.u. per hr. There are a few exceptions where rates of heat liberation of 35,000 to 40,000 B.t.u. per cu. ft. of total furnace volume have been obtained, but such rates can be maintained only in water-cooled furnaces and with coals that have ash of a comparatively high fusion temperature. Generally the rates of heat liberation are kept lower on account of excessive erosion of furnace refractory and the slagging of boiler tubes.

In solid-refractory-wall furnaces and with coals of low ash-fusion temperature, rates of heat liberation of 10,000 to 12,000 B.t.u. are good practice; with coals having high-fusion temperature ash these rates are 14,000 to 17,000 B.t.u. In air-cooled-wall furnaces the rates are raised to 14,000 and 20,000 B.t.u. according to the fusion temperature of the ash. In water-cooled furnaces rates of 25,000 to 35,000 B.t.u. are practicable, provided that proper precaution has been taken to minimize the possibility of slagging the boiler tubes and stopping the gas passages through the boiler. Generally speaking, in smaller water-cooled furnaces the rates can be higher than in larger ones, because the ratio of water-cooled surface to combustion space is greater and the products of combustion are cooled to a greater extent by the time they enter among the boiler tubes, and there is less tendency for the ash to be deposited on the boiler tubes and stop the gas passages.

The important matter of method of preparing powdered coal, namely, in a central plant or in individual units, is still unsettled and for example in the very interesting plant recently erected at Deepwater, N. J.; one set of boilers serving a 53,000 K.W. turbine is equipped with a central pulverizing plant, while another similar set has unit pulverizers.

The principal developments in pulverized fuel during the past year are, however, not so much improvements in the methods in use in central stations as the extension of adoption of powdered fuel firing toward equipment. A number of vessels were equipped during the past year with pulverized coal and have given gratifying results. The same applies to locomotives. Finally an attempt was made again to apply pulverized fuel in Diesel Engines where it is not new, but it is only in recent designs that apparently the main mechanical difficulties have been solved.

DIESEL ENGINES

New Engines.—There have been no great improvements announced in the design of Diesel engines. Some of the engines built have been, however, remarkable. The German cruiser *Ersatz Preussen* is equipped with a power plant said to be capable of developing up to 50,000 s.h.p. It is also stated that the weight of the engines is of the order of 17 lbs. per horse power, a truly remarkable figure. The recently launched White Star passenger liner *Britannic* will be propelled by two 10-cylinder, 4 cycle, double-acting engines, developing 10,000 s.h.p. at 110 r.p.m., while the French submarine tender *Jules Verne* has a propelling plant consisting of two 8-cylinder, single-acting, 2-cycle engines, each rated at 7,000 b.h.p. at 280 r.p.m. These engines are said to be the highest-powered of this type. In three recently commissioned German cruisers, high-speed oil engines are provided for cruising in addition to 65,000 s.h.p. steam plants for high speed running.

Materials for Construction.—The progress in the art of oil-engine building owes much to the perfection of the materials available for construction. The introduction of "nitralloy" steels having a glass-hard surface with a tough core has opened new possibilities for crankshafts (so far only small ones have been used), cams, pump plungers, and gears. Chromium plating was used in the Worthington engines for the Shipping Board, to produce a hard rubbing surface on a piston rod without affecting the elasticity necessary to withstand shocks of explosions. The extension of this process to cylinder liners is being perfected, and the building up of worn parts of plungers, valve stems, etc., may prove to be quite important for quick repairs. The process of building up a lower cylinder head from steel parts by a copper soldering process introduced by the German A.E.G.Co., for their large double-acting two-cycle engines will no doubt aid considerably in enhancing the reliability of large marine oil engines. Much experimental work is also being done to make welding of crankcases out of sheet-steel parts commercially feasible.

MACHINE SHOP PRACTICE

Cutting Materials.—During the year rather spectacular demonstrations were made of cutting materials with the tungsten carbide basis (compare AMERICAN YEAR BOOK 1928, p. 597). A number of such materials under various particular names have appeared on the market and showed that they are capable of machining materials previously considered unmachineable. An interesting effect of the introduction of tungsten carbide has been the improvement in high-speed steels. The trend of competition has driven the producers to extra efforts and the result has been that some of the current products show cutting ability as much as 25 per cent ahead of anything that has been available hitherto. This was done, however, at the cost of some loss of toughness in high speed steel.

Lubricating Systems.—As stated in the Show Number of the *American Machinist*, increasing attention to lubrication is decidedly evidenced by the equipment developed during the past year. No definite tendency toward any one type of lubrication is to be discovered. Some manufacturers have adopted central, forced-feed systems for their equipment. Others prefer gravity feed from central reservoirs. Still others retain the oil cups for individual bearings. Combinations of systems are also of frequent occurrence. For instance, a chucking machine employs a central lubricating system for the main bearings of the machine, but a gravity-feed reservoir for the heavy turret, to avoid the use of slip joints which would be required if the main system were utilized for turret lubrication. One manufacturer is introducing a forced-feed lubricating system operated periodically under the control of an electric timing clock. Oil filters are also finding more extensive application. In no case is lubrication neglected as a factor in machine operation and maintenance.

Factors in Machine Design.—Many other factors have become of increasing importance in machine design during the past year, and characterize practically all of the equipment placed on exhibition at the show. Among those factors which have received special consideration are: A higher degree of accuracy in the parts comprising machine tools and equipment, provisions for a higher degree of accuracy in the products turned out, ease and convenience of operation, reliability of service, compactness of design, decrease of floor space occupied, simplicity of drive, reduction of power consumption through the liberal use of ball and roller bearings, higher grades of steel and alloys for journals, spindles, gears, and other operating parts of machines, convenience of inspection and cleaning, provisions for the removal of chips, facilities for mechanical handling, and the features of higher production, greater automaticity, and adequate lubrication.

Offset Milling.—The development of offset milling is one of the rare cases where a new principle of cutting metals has been successfully introduced practically overnight.

ENGINEERING MATERIALS

High Test Cast Iron.—Unusual progress has been made in this direction. Among these may be mentioned high-test cast iron, practically a new material. Cast iron of as high as 85,000 lb. per sq. in. tensile strength has been produced, and one foundry is consistently attaining strengths of 65,000 lb. Four processes are in use, all depending on the holding of the liquid iron at a high temperature, in the neighborhood of 3,000 deg. fahr., until the carbon has been dissolved, thus preventing the formation of the plates that weaken the structure of ordinary iron.

New and Improved Alloys.—The research organizations of the aluminum, brass, and nickel companies have perfected many new alloys and improved older ones. Plastics have come very much into favor, and are replacing metals in some instances. "Stainless" and nitrided steels have found new uses.

Tempaloy.—In the field of non-ferrous materials one of the most interesting developments has been Tempaloy, a copper material containing boronsilicide. This material permits a heat treatment which gives its varying degrees of hardness somewhat similar to that of steel. This is really the first commercial instance of production of copper capable of being hardened, although copper alloys of considerable hardness have been produced before.

Chrome Plating.—Further progress has been made in the field of chrome plating. On one hand the various factors affecting the production of the deposit are now pretty well understood, in particular the influence of a very close control of temperature. On the other hand, the initial optimism as to the universally wonderful qualities of this new deposit has been somewhat dispelled. We know now approximately when and under what conditions chrome plating produces excellent results and when it is better not to use it at all.

REFRIGERATION

Ice Flakes.—The past two years saw the development of domestic refrigeration to the status of a big industry. Surprisingly, there has been no corresponding progress in the field of artificial ice making, if we make exception for the very ingenious machine (Crosby Field) for making ice flakes. The principle of this apparatus is freezing of a thin layer of ice upon a metal surface and removal of this ice in flakes by mechanically distorting the metal. Clear ice can be also produced by this method.

Freezing Systems.—A Russian engineer, Zarochentzoff, has proposed a method of rapid freezing and chilling of fish and meats in atomized brine, based on the great conductivity of finely pulverized brine. The Vaugirard Cold Stores in Paris are already using it on a commercial scale. On the other hand, the Booth Fisheries Co. of Boston makes use of the Kolbe Floating pan freezing system, in which the fish to be frozen are placed in round seamless stamped pans, 22 in. in diameter and 3 in. deep and floated through a long raceway of very cold brine.

HYDRAULIC MACHINERY

Effect of Merger Movement.—In the past year there has been a strong movement towards consolidation of public utilities into a few great systems. The formation of the Hudson-Niagara Corporation, the consolidation of the Insull properties in the Middle West and the absorption of several sizable companies such as the Rochester Central Power by the Associated Gas and Electric Company, may be cited as instances only. This movement will materially affect the field of hydraulic engineering as much the greater part of the water power of the United States and Canada is owned by public utility companies. Among other things it makes it easier for the companies to get funds to carry through such big projects as the Conowango River and the Saluda. The growing tendency of steam railroads toward electrification is also a constructive factor in the water power field.

Power Generation Factors.—As has been pointed out before, improvements in steam power generation have been such as to bring costs within competitive range with water power costs of two years ago. Hydraulic engineering is trying to meet this competition, first, by improvements in construction such as automatic operation, and, second, by simplification of design which may result in lower construction and operating costs. Besides the automatic and semi-automatic plants, this tendency is also represented by the outdoor or semi-outdoor type of hydro generating station, consisting of one or more units remotely controlled, either from another power station or by variations in forebay water level. On the other hand the development of water power on the Pacific Coast may be greatly retarded by the discovery of an important natural gas field in central California, making it possible to produce steam power in gas-fired installations at an unusually low cost.

Dam Construction.—All of this means closer attention to details simultaneously with breaking into radically new fields. Taking, for example, dam construction. It has been realized that contraction joints should be provided in at least two directions in massive unreinforced concrete masonry, in order to avoid the possibility of dangerous cracking. New methods of placing concrete, notably the use of articulated belt conveyors and towers, have recently been introduced, thus avoiding the horizontal flow of concrete and the segregation of material. Likewise, the water-cement ratio need no longer be influenced by the consideration that the mixture should be plastic enough to flow readily in chutes. Recent investigations by means of telemeters imbedded in large concrete masses, such as dams, have revealed the existence of high local temperature stresses. Investigations in regard to this matter are now in progress at the Shaver Lake Dam, in southern California, and at Bull Run Dam, in Oregon.

Turbines.—The most notable development in the past year has been the installation at the Devil's River plant, in Texas, of a Kaplan-type high speed turbine with blades adjustable from the governor. More units of this type are being installed or are under consideration. In the Back River project in Canada, high speed runners are to be installed with hand-adjustable blades in addition to which there are provided ejectors which are expected to increase the output of the machines approximately 1,000 h.p. each during periods of high water. This type of installation permits a much more efficient use of a variable flow. Propeller type turbines have been successfully applied in the Great Falls plant of the Manitoba Power Company where the head varies from 17½ ft. to as high as 60 ft. In the field of impulse turbines, improvements have been made in their efficiency by improving the shape of the buckets and nozzles, and by the addition of baffles to prevent water from entering the housing. There has recently been put into operation an impulse turbine of 32,200 h.p., at 143 r.p.m., under 800 ft. head, of the double overhung impulse type. The impulse wheels are each 176 in. in diameter, or 21 in. greater than that of the largest previous units. The jets impinging on the buckets are 14 in. in diameter. This unit was installed in the San Francisquito No. 1 plant of the Bureau of Power and Light of Los Angeles. In the Big Creek No. 2-A plant, of the Southern California Edison Company, two double overhung single-nozzle impulse units of 56,000 h.p. capacity, under 2,200 ft. head, were installed. These machines are of record capacity for this type of turbine, and have developed a maximum of 70,000 h.p. each over long periods.

During the year, the highest-head plant in the East was placed in operation: namely, the Waterville Plant of the Carolina Power & Light Company, at Waterville, N. C., operating under 861 ft. head. The principal features of this plant are a constant-angle arch dam 180 ft. in height, a 14-ft. tunnel drilled in solid rock, approximately 6 miles in length, and the use of reaction turbine of 33,500 kw. each. The development of hydraulic turbines has been greatly assisted by progress in electric-arc welding and also by extensive use of rubber in the form of sealing strips and rubber lined bearings. Bearings of this type 22½ in. in diameter are installed at the Back River plant in Montreal. The height of power uses in some cases has been reduced by the use of the so-called umbrella type electric generators. This type of generator lends itself particularly to the semi-outdoor type of installation. It is expected that its adoption will be further assisted by the recently developed Kingsbury spherical combined thrust and steady bearing.

THE IRON AND STEEL INDUSTRY

Blast Furnaces.—A recent experience seems to have clearly indicated the merits of both larger blast furnaces and larger open hearth furnaces. In the former field the wide hearth blast furnace has been making good progress. One such furnace with a hearth diameter of 24 ft. 6 in. and a bosh of 26 ft. 3 in. is said to have produced in 1928 a daily average output of 1008 tons. The extremely large open hearth furnaces such as the 350 ton capacity at the Weirton Steel Company apparently gave excellent satisfaction in the past year. The furnaces are so large indeed that two huge ladles have to be used to take away the metal. A clearer understanding of the chemistry of steel making in open hearth furnaces has been gained among other things, by the experiments of the Metallurgical Section of the Pittsburgh Experiment Station of the U. S. Bureau of Mines, which found that the amount of iron oxide dissolved in liquid steel is very much higher than was formerly believed to be the case. This fact emphasizes the importance of knowledge of chemical composition and physical properties of the slag and the necessity for an even more careful study of deoxidizers than has been carried out up to the present time. It confirms among other things, the old saying of steel melters to the effect that "make a good slag and the steel will take care of itself."

Electric Furnaces.—The size of arc furnaces has been steadily growing, the largest, it is believed, being operated by the Timken Steel and Tube Co. at Canton, Ohio. These furnaces in their rating closely approach to the smaller size of the regular open hearth. Of late the electric furnace has found an important application in the field of recovery of chromium- and nickel-steel scrap. When handled in an ordinary open hearth this scrap loses the valuable alloying elements to the slag. In an electric furnace it can be melted practically without any such loss. The furnace installed for this purpose is said to be an induction furnace with the coils located above the hearth. It is of 6 tons rated capacity, and while its initial cost is rather high owing to the very low frequency that has to be used, the economic results of operation are said to have proved to be highly attractive.

Pipe.—Many improvements have been made in the methods of production and subsequent treatment of seamless tubing, and expanding up to large sizes has been introduced commercially. New methods of welding have come to the front and a huge tonnage of the larger sizes has been manufactured; smaller sizes and light gages are also being produced on a large scale.

Sponge Iron.—Blast furnaces have not as yet been eliminated, but headway is being made with the so-called Hornsey process. The Smith process may prove to have a certain field; some of the results look hopeful.

Foreign Patents.—A significant development in the past year is represented by the tendency of American manufacturers to take out licenses under patents originating in Germany. Two of the most important of such developments have been the introduction of cutting metals of the tungsten carbide type, referred to elsewhere, and the introduction of the nitriding process, both inventions of members of the staff of the Krupp Company. Another foreign invention which has been taken up by an American manufacturer is "perlit" cast iron. The Midvale Company, on the other hand, has taken out licenses under French patents owned by the Commentry - Fourchambault et Décazeville Co. for the manufacture of a heat-resisting alloy of the chrome-nickel-iron type.

RAILROAD ENGINEERING

Aerial Hook-ups.—One of the most spectacular developments in the past year has been the decision of the railroads to take to the air. Two such hook-ups on a big scale have been made, one by the Pennsylvania Railroad and the other by the New York Central. Thus far sufficient data has not been published to show how the traveling public is taking to this new form of transportation.

Locomotives.—The high pressure locomotive is making rapid progress. While in America 350 pounds in a locomotive is still considered high pressure, in Europe they have gone far beyond that, operating with steam pressure as high as 1,500 pounds. The Delaware and Hudson has placed, however, an order for a 500 pound pressure locomotive of the cross-compound type. The turbine drive locomotive is making slow progress. The most significant attempt is the use of the non-condensing turbine. The Ljungstrom Company also proposes the conversion of piston locomotives to non-condensing turbine locomotives by replacing the cylinders with the back pressure turbine driven through reduction gears and a jack-shaft. If this proves to be possible it will certainly be helpful by making it easier for railroads to try turbine locomotives without incurring the rather heavy risks of ordering a special unit which if not satisfactory would have to be scrapped completely.

Internal-Combustion Locomotives.—The success of this type of locomotive in switching service has led gradually to its adoption, on a small scale as yet, for regular mail-line service. During the past year the Canadian National Railways placed in service the most powerful oil-electric locomotive ever built. This is especially noteworthy because it is the first of the internal-combustion type which approaches the power output of the modern steam locomotive. Two units make up the complete locomotive, which weighs 650,000 lb., with 480,000 lb. on the driving wheels. The wheel arrangement is of the 4-8-2-2-8-4 type. Motive power is provided by two 12-cylinder Beardmore high-speed solid-injection oil engines of 12 in. bore and 12 in. stroke, rated at 1330 h.p. at 800 r.p.m. The fuel consumption of the engines is 0.43 lb. per h.p.-hr. A comparison of this locomotive with the latest steam locomotives for passenger service on the same road shows that from 20 m.p.h. to maximum speed the steam locomotive develops slightly greater tractive force, but below 20 m.p.h. the advantage is in favor of the oil-electric. Designs have been prepared for a similar locomotive for freight service, which will develop a maximum tractive force of 130,000 lb.

In England a locomotive has been built equipped with a Still engine which is an internal-combustion engine producing steam from its cooling water. The motive power consists of a 4 stroke heavy oil engine with 8 cylinders. The water jackets of the internal-combustion cylinders are coupled by pipes to a boiler located above the engine. This boiler supplies steam at 200 lbs. pressure which can be applied to the inner sides of the pistons for starting or to be used as an auxiliary power on steep grades. The steam engine is of 13½ in. bore and 15½ in. stroke. Tests made so far show that the figures of consumption are below the best records for steam locomotives in similar service, but it is thought that the steam locomotive will give its best results on longer runs with few stops and less severe grades.

Special Fuels.—A vigorous effort has been made to apply special fuels to locomotive work. In Germany pulverized fuel has been successfully tried. The most interesting attempt in America is expressed in the Northern Pacific locomotive especially designed to burn Eastern Montana subbituminous coal which is high in moisture and has a relatively low heating value. This requires a very large boiler and it so happens that the locomotive in question is the largest and most powerful steam locomotive in the world.

REPLACEMENT OF MEN BY MACHINERY

Controlling Factors.—The tendency towards this has been pointed out in THE AMERICAN YEAR BOOK for 1928. Once such a movement starts there is no stopping it. In the past year there have been several instances startlingly illustrating this tendency. In hydraulic engineering the remote control automatic or semi-automatic plant is finding extensive application. The introduction of continuous sheet-rolling has eliminated or rather displaced a large amount of labor which would have been required to roll the same tonnage on hand mills. The A. O. Smith Company of Milwaukee built a plant for the manufacture of automobile frames, where human labor is cut down to a very small fraction of what would have been necessary with previously existing equipment and most of the operations are so controlled that it is merely a matter of time until human labor will be next to completely eliminated in this kind of work.

Changes in Labor Functions.—Where there is no actual displacement of labor by machinery, a profound chance is noticeable in the functions of labor. As illustrated, for example, by the frame manufacturing company, referred to above, even where labor is employed, its duties consist chiefly in straightening out troubles, rather than doing the actual operations. Some mill managers are beginning to say now that in their plants at least, "labor earns profits only where it does nothing."

Employment Adjustment.—It would be rather premature to discuss whether or not this replacement of men by machinery is apt to produce extensive unemployment. Machines do not grow on barberry bushes and they wear out. Somebody, therefore, has to build them, while other people have to maintain them, provide replacement parts, etc. This simply means that to a certain extent the labor in a mill has been replaced by other labor in machine construction plants and repair shops. Whether or not the number of men so employed, on what might be called industrial rear, is smaller in number than the number of men displaced on the front line is a question which cannot be reliably answered because of lack of statistics. It may be noted, however, that while the tendency towards replacement of men by machinery has been very prominent in the past year, no clear indications of growing unemployment have appeared.

ELECTRICAL ENGINEERING

By J. G. Brainerd

Moore School of Electrical Engineering, University of Pennsylvania

SYSTEM AND PLANT ECONOMY; TURBO-GENERATOR UNITS

Apparatus Difficulties. — Central stations, and the generating units in them, have been steadily increasing in size, and in addition to the difficult questions of reliability and stability of systems and individual units, there has been encountered increasing difficulty in obtaining auxiliary apparatus, particularly oil circuit breakers and reactors, to go with the larger units. One result has been to increase generating voltages up to as high as 33,000 volts (London), to keep current values within economic limits, and incidentally to eliminate transformers between generator and distribution system.

Investment and Operating Costs.—There has been considerable discussion of rising investment costs per kv.-a., most of which has been due to increase in cost of the electrical rather than the steam plant. One study of large plants showed that first costs ranged from $81 to $144 per kv.-a. of capacity, but as was noted, unit costs of stations etc. are now of less interest than unit costs of systems, including interconnection capacity. Interconnection is gradually making plant development a question for several companies rather than one in any particular case, and it is making economic criteria the costs etc. per unit of system capacity rather than costs etc. of the isolated system capacity. One source of increased costs has been the distribution system, almost necessarily more expensive and complicated with the concentration of power sources in fewer and larger stations.

The power generation committee of the American Institute of Electrical Engineers has predicted that many new steam plants will be built in the next few years, whereas there are few large hydro projects in view, and in parts of the country where hydro power is available, large steam stations are being erected (Gorgas plant of Alabama Power Company, Pacific Coast companies). It would seem that the near future would see developments tending appreciably to decrease investment and operating costs of steam plants, particularly the electrical portion of the plants. One possible method of increasing efficiency and net costs is to be found in the use of high pressure steam.

High Pressure Steam.—In 1925 the Boston Edison Company installed a 1200 lb. steam turbine, and it has proved economical and successful. High pressure steam is widely used in new European installations. Recently equipment to operate at 1800 lbs. pressure was ordered by another company and 2200 lb. pressure at 1000 deg. F. has been advocated. The new Holland station of the Pennsylvania—New Jersey Power System (General Gas and Electric Corporation.) will use 1200 lb. steam and have an ultimate capacity of 220,000 kw. Likewise the new Deepwater

(Wilmington, Delaware) station will use 1200 lb. steam. It is to be jointly owned by two utility systems, the American Gas and Electric and the United Gas Improvement Company, and in addition to supplying electric energy to the two systems, it will supply steam to a nearby industrial plant. This is seen as a distinct commercial advance, and may be a "milestone marking progress" of electric utilities in a new business field. The Pacific Gas and Electric Company has ordered two units, each rated 50,000 kw., to be fueled by natural gas piped 240 miles. Steam at 1200 lb. pressure will be used, and a new type of construction is to be undertaken, in which the high pressure turbine and generator will be mounted on top of the low pressure generator, saving foundation and floor space ordinarily required for the high pressure turbine.

New Installations.—During the year two 160,000 kw. turbo-generators (260 lb. steam) were placed in operation at the Hell Gate station of the United Electric Light and Power Company (New York). Each unit has two electrical generators. A third unit is being installed. The Brooklyn Edison Company has a 110,000 kw. unit (one generator, 400 lb. steam) and another is to be placed in service in 1931. The Hell Gate units illustrate advance in design, since they occupy space originally laid out for 30,000 kw. units.

The Long Beach No. 3 plant of the Southern California Edison Company operating one 100,000 kw. unit, reports for the first six months of its operation an average B. T. U. rate of 13,081 B. T. U. per net kw.-hr. Oil is used for fuel. While this is not as good a record as that of the Columbia steam station of the Columbia Gas and Electric Company (AMERICAN YEAR BOOK, 1927), it is worth noting because it is the first report of fuel efficiency from a plant using one of the many very large generators which have been installed in recent years.

Trends in Design.—The major trends in turbo-generator design appear to be toward higher steam pressures, higher temperature (1000 deg. F. is now used in some European plants, and the Detroit Edison Company is to have a 365 lb., 1000 deg. F. unit, the first in this country); use of direct connected generators on large units for driving auxiliaries, although in one important recent exception auxiliaries have been operated from the high tension lines on the principle that when the lines are down the steam plant is useless; use of hydrogen for cooling; high generator terminal voltage (a method of reducing corona in high voltage units was announced during the year) and larger units. Welding has raised the transportation limits on large units made at the manufacturer's plant, and limitations of mechanical design are being carefully studied. The mercury-vapor unit (A. Y. B. 1927) at Hartford, Connecticut, has been pronounced a success. Further discussion of the steam plant, new processes for generating high pressure steam, etc., must be left to the article on Mechanical Engineering.

Generating Capacity.—The overall load factor of systems has been steadily increasing, an indication of the results of interconnection and new stations, among other things. In 1922 the generating capacity installed in this country was 17,960,000 kv-a; in 1928 it was 31,300,000 kv-a; in 1922 total energy generated was 43,560,000,000 kw-hr., giving a load factor of 27.7 per cent; in 1928 there were 87,849,000,000 kw-hrs. generated giving a load factor of 32 per cent, which represents an increase for 1928 of 2.4 per cent units over the 29.6 per cent of 1927. Automatic stations, some of which have a capacity as great as 100,000 kw., contain radical and economical changes in station arrangement, particularly in the use of small isolated switchboards at individual units rather than the usual large concentrated one of the manual plant. The greatest need of these plants is for economical and reliable recording devices. Switchboards of non-automatic plants are, however, being scrutinized carefully. With meters, wiring etc. they constitute an appreciable proportion of the total cost of a plant, and it has been suggested that removal of all meters, signal lamps etc., not essential to switching, from the main board to a miniature board near the unit; with small meters, indicators, etc., is possible. A reduction in cost of $10,000 per unit controlled is reported to have been effected in one case. Metal-clad, compound-filled, switchgear (AMERICAN YEAR BOOK, 1928) is becoming increasingly popular in this country (it has been used extensively for several years in England). It is claimed it increases reliability, reduces design and construction costs, and increases system flexibility.

"Rotating Bus."—Substation design likewise underwent a radical change with the advent of the "rotating bus." Bus selectors switches are used for top-off connections from buses to disconnecting switches of oil breakers. The new method of connection eliminates idle connections, requires less ground space, and reduces the number of insulators, etc.

SYSTEM STABILITY AND RELIABILITY

Designs and Methods.—During recent years engineers have given considerable thought to methods of designing new and redesigning old power systems to give great overall reliability of the power source and small fault kv-a. There are four general systems in use for minimizing the area affected by a short-circuit or other fault in a system where distribution is at generator voltage, as is that of most metropolitan systems, viz., (1) reactors in busses etc. at suitable points, (2) independent stub busses, and auxiliary synchronizing bus and reactors, (3) double winding generators, (4) synchronization at the load. The first two methods are old, the latter two new.

The double winding generator is one in which the windings have been split into two parts, each of which functions as a separate unit. These are connected to separate busses, and a fault on one bus will not seriously affect the winding of the machine not connected to that bus provided the two windings are not clsely coupled. Furthermore, since the two windings of a machine are on a common stator and have a common field, and supply adjacent busses, the units will stay in synchronism during the transient disturbances. The double winding generator is typical of several magnetic methods of connection which are finding favor, chiefly because of the lower fault kv-a., with resultant cost reductions due to the decrease in short-circuit energy concentration and to the fewer service interruptions. There are plans to use three winding transformers, with the two primary windings connected to separate generating sources. A double winding generator of 160,000 kw. capacity was installed by the New York Edison Company this year at its East River Station.

"Synchronization At The Load."—The new method of system connection known as "synchronized at the load" has been developed and placed in successful use by the United Electric Light and Power Company in New York City. Under this new plan, all loads and all generators are connected on a distribution network or grid, in such a manner as to give paralleling paths between generators only at loads, the loads thus acting as paralleling busses. The system eliminates generating station and substation busbars, and "represents the ultimate in decentralization of power supply." Some of the advantages claimed for the new system are that it has ample synchronizing ability to give stability to a number of independent power sources, which may be located in different central stations; generators "synchronized at the load" can be connected by supply feeders to a number of load points, thus making it impossible for one fault to affect all of the generating capacity, from which it follows that a system possessed of sufficient reserve capacity cannot have its reliability affected by a single fault; reliability dependent upon having sufficient spare capacity immediately available to compensate for the greatest reasonable number of major faults which may occur before other spare capacity can be made available; load and wattless control is simplified, oil circuit breaker duty is reduced, voltage fluctuation at loads during system disturbances is materially reduced; the need of reactors obviated in part; and probably substations may be eliminated (AMERICAN YEAR BOOK, 1928). The scheme is claimed by its sponsors to "provide the solution to the problem of reliability of supply and low system costs." Not all systems are adaptable to this new scheme. It has been suggested that double-circuit generators used with a "synchronized at the load" network can withstand almost any bus fault, thus increasing stability and decreasing the spare capacity necessary.

Automatic frequency control has received much attention recently, one reason being the widespread use by consumers of synchronous motor-driven clocks. At the present time speed of generators, and the speed time of a system, can be held to within 0.1 cycle of normal by automatic control on a system with total interconnected load of nearly a million kw. The types of apparatus used are based on different principles, one using the integrated time error of the system over a very short period, and having a seconds pendulum for a standard, another using a system which amounts to taking periodic view of the instantaneous frequency. A third system, by which the frequency range was kept within 0.05 cycles on a 50 cycle system when the load was increasing as rapidly as 3000 kw. per minute, uses the high and low frequency alarm on the plant graphic frequency meter.

Vacuum tube circuits have been introduced for synchronizing generators when taking on load. They eliminate the high voltage transformers etc. previously required, one small coupling condenser being used to connect a bus to the vacuum tube amplifying circuit which helps actuate a synchroscope.

TRANSMISSION

Study of Lightning.—Probably the most discussed technical topic of the past several years has been the general question of high voltage transmission and protection. While for open wire transmission lines the American limit is, as it has been for several years, 220,000 volts and 200 to 300 miles maximum transmission, on cables the use of 130,000 volts is comparatively new (AMERICAN YEAR BOOK, 1928). However, because of the increase in size of power systems, the effect of lightning and system disturbances on transmission lines has come in for a huge amount of study. To indicate the progress that has been made, the following quotation, from a paper by F. W. Peek, Jr., may be appropriate: "While there is still much to learn, lightning may be said to be now at least on an engineering basis since it is expressed numerically in volts and amperes. The following indicates how rapid the progress has been: The wave shape of lightning has been pictured by the cathode ray oscillograph; the time required for a cloud to discharge has been measured by the cathode ray oscillograph; the attenuation of lightning waves traveling on a transmission line has been determined; natural lightning waves have been reproduced in the laboratory where their effects on transmission lines, insulators, insulation, transformer, and protective apparatus have been studied at will; a lightning generator producing over 3,600,000 volts (extended to 5,000,000 volts later) has been constructed and waves from this generator have been sent over transmission lines to test full size transformers and other apparatus to determine how to make them highly resistant to lightning; scientific work on the time lag of gaps and insulation has been extended, etc."

Protective Measures.—In general, protection against lightning will usually be sufficient for lines to withstand switching surges etc., since crest voltage due to lightning is of the order of magnitude of 15 times normal line to neutral crest voltage, compared to a ratio of 5 for switching. On the average system, insulator flashover voltages range from 9 to 14 times normal, using a particular type of wave. The wave shape of the surge is of importance, and practically its study has begun only recently.

The means of reducing lightning disturbances are to not build lines in known storm areas; reduce distance between conductor and ground by building lines lower or introducing ground wires—lower transmission lines represent a reversal of former tendencies dictated by economies to have few line supports hence have conductors high, giving a maximum storm exposure; increase line insulation—this cannot be done to such a degree as to eliminate all flashovers (a shield for insulators corresponding to the ground wire for the line has been developed); use protective devices such as the Petersen coil used in Europe at insulators; use lightning arrestors. There is some question of economy in protecting lines from lightning so that they have great reliability, and it has been suggested that double circuit lines may be cheaper. Statistics show that both circuits seldom go out at one time. There is also a possibility that the future will see lightning arrester features incorporated in the insulators. The use of wood pole lines for very high voltage transmission has been advocated on the basis that the insulating properties of the wood may be used to advantage, but there is considerable objection to them. Grounded systems have an advantage over ungrounded systems in that the line to ground voltages of the latter are unstable whereas with the former these are fixed and lightning arresters of these minimum ratings can be used.

Insulation.—Insulation, high voltage cables, dielectric loss etc. have been discussed at great length. To quote J. B. Whitehead, speaking of insulation: "An enormous mass of experimental data has already been presented. So wide is the problem, however, that these data have not only failed to place the design of insulation on a satisfactory engineering basis, but still leave it as practically the most important problem confronting the electrical engineer today. . . . It is increasingly evident that the possibilities of the empirical study of (insulation) materials are about exhausted." Some insulation advances include the development of a flexible form of Glyptal mica insulation, and a study which showed that the surface condition of porcelain insulation has great influence on its strength, particularly when the surface is subjected to a tensile stress.

Cable Protection.—Recent work has shown that high pressures (85 lb. per square inch) may develop in cables on heating, and slight vacuums on cooling, harmonics appear in the charging current of poorly impregnated cables, ionization occurs chiefly at low loads and low temperatures, cable installation and operation are responsible for many failures, etc. Oil filled cables can be produced by manufacturers with only 1.3 per cent of voids. The general study of the reduction of losses in cables has led to improvements. Rubber-insulated cables of 15,000 kv-a. capacity operating at 27,600 volts, the highest for rubber-insulated cables, have been placed in service under the East River, New York. A new 12 miles 132,000 volt cable line is to be added the present one, dating from 1927, from Hell Gate station (New York) to Dunwoodie distributing station. One new development in oil-filled cables is the "sectionalized, balanced pressure" cable, reels of which are shipped and installed under oil pressure without draining the oil from the channels, the latter being at ground potential. Each cable length has its own feed, allowing maximum pressures to be kept within conservatively low limits, and seepage from one section to another is so slow that if one section fails, adjacent sections will remain in good condition for many hours. A 24 kv. aerial cable line, using a modified catenary suspension, was installed by the Detroit Edison Company.

The Thury system of direct current high voltage transmission may be used to transmit hydro-electric energy 570 miles from the Assouan dam in Egypt. If 300,000 volt transmission is used, with mid point grounded, insulation need be for only 150,000 volts.

APPARATUS AND EQUIPMENT

Deion Circuit Breaker.—The outstanding development of the year in the apparatus field was that of the deion circuit breaker, the result of an intensive research on electric arcs carried out by Dr. J. S. Slepian and his associates of the Westinghouse Electric and Manufacturing Company, in the course of which certain classical physical theory was overthrown. It was shown in the preliminary investigation that it is possible to have an arc with cold electrodes, and that there is a small space near the cathode which is deionized almost instantly when the alternating current passes through zero. To take full advantage of this, the primary arc is broken into a number of smaller arcs in series; these are blown by a magnetic field through a stack of copper plates at such a speed that the plates remain cold, and since at the zero of the current the cathode (copper plate) has a deionized gas layer nearby, which because of its state can withstand a voltage greater than the voltage corresponding to the part of the arc included between the given cathode and the adjacent copper plate, the arc is extinguished. The arc is originally broken into the smaller arcs by being forced between the plates by the magnetic field. Since the voltage distribution in the arc is not uniform a compensating shield is used.

The deion breaker has been tested in the field, breaking 20,000 ampere arcs easily, and is being manufactured to operate at voltages up to 15 kv. It is possible that the oil circuit breaker, which has usually been considered dangerous and seems to have been used for lack of a better device, may be supplanted by this new breaker. Flames from electric arcs and streamer currents in high voltage sparkovers have also been recently studied in the same laboratory with interesting results.

New German Breaker.—Another new breaker has been developed in Germany. It forces compressed air into the arc and blows it out, operating on a principle opposite to that of the vacuum breaker, which has worked satisfactorily on test but has never been adopted. This new breaker has repeatedly broken 500,000 kv-a, breaking the arc into half of a cycle.

Transformer Installations. — A three phase 25 cycle autotransformer with the greatest output rating (83,300 kv-a) ever given a single transformer unit has been built for the Buffalo General Electric Company. The high voltage or series winding consists of two separate windings, each to be connected to a separate section of station bus, thereby limiting short circuit currents.

Four oil-cooled transformers, rated 60,000 kw., 220 kv., and tested at 570 kv., the highest test voltage ever applied to a power transformer, were shipped from Sharon, Pennsylvania to Roseland, New Jersey on specially constructed freight cars, after some railroad bridges had been strengthened and tracks lowered to allow passage. The transformers are to be used in interconnecting the Public Service Gas and Electric Company with the Pennsylvania Light and Power Company and the Philadelphia Electric Company.

A totally self-cooled three phase, 60 cycle transformer rated 40,000 kv-a. the largest of its type ever built, has been installed by the United Electric Light and Power Company (New York). It has an efficiency of 99.54 per cent at half load, the highest of any two-winding transformer. A transformer bank rated 100,000 kv-a. has had its rating increased to 130,000 kv-a. by the addition of air blast equipment which increases air circulation about the radiators through which the insulating oil passes to be cooled.

Transformer oil retains its insulating properties for a great time if kept from contact with oxygen and moisture. This has been accomplished by keeping the top of the interior of transformer tanks filled with an inert gas mixture of which nitrogen is the chief constituent. The inert gas is non-combustible, hence tends to prevent any explosion occurring in the gas space.

Transformer Tests.—American and European engineers have taken opposite sides on one part of the question of transformer tests, Europeans urging the use of high frequency surge tests in which stresses duplicating those due to flashovers from lines to earth are supposed to be obtained, while the Americans want an impulse test, in which a d.c. impulse from a lightning generator or similar apparatus is impressed across the transformer terminals. This sets up stresses simulating those due to lightning, which American practice shows sets up voltages of ten to fifteen times rated circuit voltages, whereas arcing grounds, etc. seldom cause voltages greater than five or six times rated voltage.

Experimental determinations of the effect of lightning on transformers has been carried out, showing among many other interesting results that points of the winding near the grounded neutral may arise to a potential almost equal to the crest voltage of the lightning wave, and reactors in series with transformers cause rises in voltage across transformer terminals and internally.

Reactors, in common with much other electrical apparatus, have been steadily increasing in maximum rating, and the use of oil immersed reactors of large size is becoming common. A new (English) type of line surge arrester is practically a reactor with air core, enclosed in a metallic tube, and the whole connected in series with the line. Inductance of the reactor, energy dissipation in the metallic casing, and capacity between reactor and casing all serve to limit surges. Another (German) method of limiting short-circuit currents, particularly in low voltage circuits, is found in the use of resistors made of material of large positive temperature coefficient. A surge heats the resistor, increasing its resistance, and thereby limiting the current. The action can be made as quick as circuit breaker tripping. A "shotgun" fuse, a high voltage fuse containing a shotgun shell which is exploded by excessive current through a wire running through the shell, has been successfully used.

Independent Protection.—Relay protection is in general of the time differential type, but recently there has been a trend toward "independent" schemes whereby the protection of one section of line is independent of that of an adjacent section. The impedance relay, developed in recent years, offers a protective scheme of this type in part and is gradually increasing in use. A new relay with tripping time and distance indicating features proportional to reactance rather than impedance, hence independent of fault resistance, was announced during the year. Another scheme, a modification of one now used to a small extent in this country in which relays are given instantaneous rather than selective time settings and pilot wire relaying between relays is used, involves the use of high frequency current on the transmission lines in place of the pilot wires. The new system is limited largely at present by costly terminal equipment required.

Motors.—The condenser motor, a small induction type motor with improved characteristics, is being developed and a new motor known at the diverter pole generator, developed to overcome certain limitations inherent in shunt and compound generators when used for charging batteries, was announced. Line start motors have been extensively discussed, motor users desiring them because of lower equipment cost and utility representatives objecting to surges caused by them.

Elevator Control.—A vacuum tube system of elevator control, by which a car is automatically stopped at the floor level, has been developed. The car is stopped by the action of relays controlled by a vacuum tube oscillator whose oscillation is gradually stopped by a system of coils and vanes as the car approaches a floor.

Electric Power Shovels.—The development of electric power shovels with 16 to 20 cubic yard buckets has been largely instrumental in the great increase in strip mining in recent years.

INSTRUMENTS AND MEASUREMENTS

Progress in Unit System.—Some progress is being made toward the adoption of an absolute system of units in place of the international system, but the Advisory Committee on Electricity of the International

Committee of Weights and Measures has declared the need of further investigation of the relations between the systems. A critical summary of results up to 1929 is to be found in an article by Birge, *Physical Review Supplement*, July 1929.

Recording Transient Power. — There is a growing tendency, due to the importance, size and far reaching effects of transients in interconnected and large systems, toward the automatic recording of transients, just as most steady state quantities are recorded. Several new types of oscillographs have been developed, together with an oscillographic wattmeter for recording transient power. One new cathode ray oscillograph uses a special hot cathode electron gun for automatically starting and stopping the beam in recording lightning surges. The oscillograph is also finding widespread use in the measurement of non-electrical quantities such as stress, pressure, etc., and other electrical instruments are also being used to a great extent in nonelectrical fields, particularly hydrodynamics and thermodynamics.

Photoelectric cells are finding widespread use in instruments such as sorters and counters, spectrophotometers, smoke recorders, meter testing instruments etc., and in a new type of precision frequency changer for instrument caliabration.

Metering.—The Metropolitan Edison Company of Reading, Pennsylvania, introduced an innovation in making use of outdoor metering, customers' meters being erected outside of dwellings. In Europe, due to complicated rate structures accompanying the highly developed use of offpeak energy, three rate meters and higher rate meters are in use.

WATER POWER

New Projects.—While it is pointed out elsewhere in this article that hydroelectric development may soon slow down, there is as yet no dearth of new projects. Among those of the year are the 500,000 hp. development of the Beauharnois Light, Heat and Power Company on the St. Lawrence River, entailing the construction of a canal 14 miles long and 4000 feet wide joining Lake St. Francis and Lake St. Louise; a $125,000,000 (ultimate) project of the Aluminum Company of America along the headwaters of the Tennessee River, involving 8 dams (7 in North Carolina) —it is possible that the energy output of this system will be greater than that at Niagara Falls; and numerous others including a possible large hydro development of the Ontario Hydro-Electric Power Commission, and some plants in Switzerland with 500,000 hp. capacity. The Aluminum Company project is typical of a recent tendency to utilize full stream flow by a series of generating stations located along the course of the river. Work on the 300,000 hp. development of the New England Power Association on the Upper Connecticut River is proceeding. This will be one of the largest hydro plants in the eastern part of the country. The chief of army engineers has recommended that the Potomac River Corporation be granted permission to develop a hydro project at Great Falls, near Washington, D. C.

Total capacity of water power plants in the United States at the beginning of the year was 13,571,530 hp., an increase of 1,275,530 hp. or 10.4 per cent during 1928, compared to an increase of 575,000 hp. in 1927.

Output.—Forty per cent of the total output of 87,851,000 kw-hrs. of public utility power plants in the United States in 1928 came from hydro plants, a greater ratio than ever before. The total output of all plants was 10 per cent greater than that of 1927.

The Federal Power Commission, according to an interpretation of the water-power law by its chief counsel, has jurisdiction over rates and services of utilities engaged in interstate or foreign commerce, but the Commission's jurisdiction over intrastate commerce in electrical energy within a state exists only in so far as the state does not provide regulation, and only by contractural agreement with the utility. The late Secretary of War Good, Chairman of the Federal Power Commission until his death predicted that a new board, not composed of Cabinet members, must be created by Congress, the members devoting their time entirely to this work.

Forecasting Rain Precipitation.—A method of correllating the annual growth of trees, as measured by spacing of annular rings, with rainfall may prove of aid to utilities dependent on hydro plants to large extent in forecasting precipitation. While short time precipitation cannot be predicted, cycles extending over several years apparently can be.

ELECTRIC TRANSPORTATION

Progress in Electrification of Railroads.—The Pennsylvania Railroad's $100,000,000 electrification program has progressed according to schedule, so that the Philadelphia to Trenton section may be in use late in 1930. The Reading Company's electrification of lines entering Philadelphia is advancing. These will be high voltage a. c. lines (AMERICAN YEAR BOOK, 1928). These two railroads and the Lackawanna will use power purchased from power utilities, and in this connection, the following quotation from an Electrical World editorial is of interest: "The same public is being served by railroads and by power utilities with money which the public has provided. To enable railroads to serve profitably at the limited return they receive, it has been recognized that power should be sold at a price which will cover only fixed charges, cost of production delivery, billing and administration, profit being secured from the return on investment to serve, as allowed by the commission."

The Great Northern Railway opened its 75 mile electrification through the Cascade Mountains in January. The tunnel built in connection with this electrification is the fifth largest in the world. (AMERICAN YEAR BOOK, 1927). The Lehigh Valley Railroad is planning to electrify 75 miles of its line near Wilkes-Barre, Pa.

Electric and Gas Motors.—Oil-electric locomotives have been used by the Canadian National Railways for express passenger service. The New York Central is using diesel-electric locomotives for through passenger service. Many railroads have used these and motor rail cars for local service, and the Chicago, Burlington and Quincy Railroad has placed service among its 50 gas electric cars eight which are the most powerful (400 hp.) single unit gas electric cars ever built. Urban and suburban railways are continuously improving their services in their fight with automobiles (AMERICAN YEAR BOOK, 1928). Most of the advances come in mechanical design, and an all-aluminum car of light weight has been produced. A low voltage car lighting system for 600 volt traction systems has been developed. (See article on Urban and Interurban Railways.)

Electric Drive for Ships.—The fourth large passenger liner, the Santa Clara, to be built in America with electric propulsion is to be launched late in 1929. The other three are ships of the International Mercantile Line, one of which is to be launched in 1929, the other two now being in service. A new 1000 foot White Star passenger liner for North Atlantic service has electric drive planned for it.

LOAD BUILDING

Domestic Consumption. — Load building has been a greatly discussed topic in the literature of the year; electric heating of all kinds, inducement rates, sale of electric appliances, etc. all came in for discussion. A survey by the Electrical World of 57 companies showed "that the endeavor to get more customers (of recent years) has been unsatisfactory and that progress following the tactics now used can only be very slow." In 1928, the average domestic consumption (57 companies) was 512 kw-hrs.; revenue was $31.33 compared with 341 kw-hrs, and $26.87 in 1924.

Service For The Home.—According to the *Electrical World*, "a complete electric service to a home on a competitive rate basis should give figures of 7800 kw-hrs. per year with a corresponding revenue of $150-200 a year." It has been suggested that utilities own, maintain and supply electric devices and furnish a given amount of energy to consumers at a base rate, the suggested figures being 650 kw-hrs. and $16 per month. About 68 per cent of the population now have electric service. The Detroit Edison Company is developing an electric kitchen range of new type, low in price and quick acting.

LEGISLATION AND INVESTIGATION

Public Utility Regulation.—There appears to be a trend in public opinion toward Federal regulation of utilities, one reason being the lack of regulation of holding companies. There has already been introduced in Congress a bill to create a commission to regulate "the transmission of intelligence by wire and wireless," later amended to bring power transmission under the authority of the commission. The original bill was meant to place long distance telephone and radio companies under regulation; the entire bill would include holding and investment companies.

The Boulder Dam bill (AMERICAN YEAR BOOK, 1928) became a law late in 1928. It is estimated that work will not start for a year to give time for preliminary surveys etc.

Maine. — The Maine legislature passed a law permitting the exportation of electric energy from the state, bringing to an end a long fight (AMERICAN YEAR BOOK, 1927).

New Hampshire.—The New Hampshire commission approved the exportation of energy from that state.

O'Fallon Case. — The Supreme Court, in the O'Fallon case (AMERICAN YEAR BOOK, 1928) decided that the Interstate Commerce Commission had not given due consideration to the principle of reproduction cost new in fixing the valuation of the railroad for rate-making purposes. This decision, of great importance to electric utilities, is discussed further in the article "Public Service Commissions" and "The Railroads."

Federal Trade Commission.—Discussion of the Federal Trade Commission investigation, which was continued throughout 1929, will be left to the article "Electric Lighting and Power," to which will also be left discussion of the Massachusetts Department of Public Utilities victory in forcing a reduction in the maximum rate charged by the Worcester Electric Light Co.

Michigan.—The Michigan Supreme Court denied recognition as a corporate entity to the Michigan Bell Telephone Company because 99.99 per cent of its stock is owned by the American Telephone and Telegraph Company. The court declared the Michigan company to be merely an operating unit of the holding company. If the principle enunciated in this decision becomes widely used, it may have an important bearing on holding companies.

District of Columbia and New Jersey.—The Public Utilities Commission of the District of Columbia has forbidden submetering, and a New Jersey court has upheld the Public Service Gas and Electric Company in its refusal to supply energy at wholesale rates to an apartment house whose owners would resell the energy to tenants at retail rates.

ILLUMINATION

In the field of illumination, discussion has centered chiefly on three topics, aviation lighting, lighting for motion picture studios and the extension and modernization of ordinary lighting equipment. The Institute of Applied Lighting, a non-commercial permanent demonstration of all types of lighting accessories, has been opened in New York City by the Westinghouse Lamp Company. The Bureau of Standards has found by test that neon lights are not better able to penetrate fogs than ordinary incandescent lamps.

TELEPHONY

Standards of Rating.—A new telephone transmission reference system for use as standards in the rating of telephone transmission has been developed by the Bell Telephone Laboratories, one copy having been installed in Paris by the International Advisory Committee on Long Distance Telephony.

A carrier current telephone system, to be used as a substitute for open-wire line construction for circuits of such short length that the multi-channel types of carrier systems previously developed cannot be economically applied, has been developed. It provides one additional talking circuit per pair of wires. The equipment can be moved readily from one point to another, thus allowing temporary extra facilities to be available almost at will. There has been continued progress in the development of carrier current communication systems for power lines, and in several cases power companies are now using carrier communication for dispatching.

Toll telephone conversations in 1928 increased 7½ per cent over the 1927 figure, and the average time for handling a call was 1.2 minutes. The number of dial telephones increased 600,000 during 1928, about 18 per cent of subscribers' stations being now equipped with dial telephones.

MISCELLANEOUS

Edison Anniversary.—During the year electric utilities throughout the country joined with interested organizations in celebration of the fiftieth anniversary of the invention of the electric lamp by Edison, while English contemporaries reminded the world that the first electric lamp was, to their point of view, invented by Swan in England two years before Edison produced his.

Conferences.—A World Engineering Congress was held the first week in November, 1929, in Tokyo. It was well attended by American engineers. The second World Power Conference will be held in the city of Berlin in June, 1930.

Electric welding has proceeded, at a somewhat slow pace in the building field, but it has reached "a point where it may be regarded as a major influence in machine design."

AUTOMOTIVE ENGINEERING

By Austin M. Wolf

Automotive Consulting Engineer, Newark

ENGINES

Trends in Design.—The year 1929 marks the introduction of the front-drive passenger car. Its performance and acceptance is being carefully watched to determine whether it is merely a fad or has its particular place in the transportation field. The six cylinder engine trend has now reached the largest sized trucks, as has pneumatic tires. To give greater carrying capacity, a new bus design has been introduced in which the body and controls have been moved forward, with the engine projecting partly into the body.

Cylinder Development.—Eight cylinder engines continue to gain, while twelve and sixteen cylinders are being experimented with for the highest priced field. A V type using two banks of eights is the first to reach the production stage. With the increasing demand for power in buses, the eight cylinder engine has been introduced into this service to keep down the individual cylinder dimensions and stresses.

Combustion Chambers.—There are two schools of combustion chamber design, the older being exemplified by the Ricardo head in which turbulence is used to speed up flame propagation in the endeavor to suppress detonation while the newer claims that turbulence is merely a means to obtain a uniform mixture and to increase the rate of heat transfer. They aim to control the temperature of the part of the charge which burns last, by means of a high surface-volume ratio over that portion of the combustion chamber and in so doing control the acceleration in the rate of pressure rise: substantiation is to be found in an engine incorporating this theory, having a compression ratio of 5.8—1, which tops the ratios of engines capable of utilizing ordinary fuel.

Compression Ratios.—Some designers have felt that compression ratios have gone too far for smooth operation and we find the use of slightly lower ratios. In one instance there is a recession from 5.7—1 back to 5.15—1. With a slight increase in bore, the new engine develops greater power than did the former. Cylinder bores and valve diameters are still being increased. Valves placed horizontally in a V engine results in a substantially triangular combustion chamber shape. An L head chamber has a spherical portion over the piston besides the pocket over the valves. Both valves in several engines have a 30° seat for great effective opening area. Valve springs with closed damping coils are used in one instance while concentric springs, coiled in opposite directions, are used in another. As a cooling aid, aluminum bronze is used for the exhaust valve guide in a heavy duty engine.

Decarbonizing.—To be able to translate laboratory results to the field would be ideal but deterioration in service prevents it. A step in this direction is to be found in the decarbonizer on one car where a plunger is provided to inject a charge of chemicals into the intake manifold while the engine is speeded up and left to stand over night to soften the carbon.

Alloy Piston.—A new high-silicon aluminum piston alloy has been introduced having a lower coefficient of expansion permitting close fitting without the need of expansion slots or separation of the skirt from the head. Tungsten carbide has made its machining commercially possible. An alloy piston design with slots and head separation has a cast-in slot dividing the piston pin boss. The outer boss is on a vertical channel-shape web uniting head and skirt while the inner is on a horizontal web uniting the skirt sections adjacent to the boss relief. A bus alloy piston of the constant clearance type has two invar rings cast in, one at the lower edge of the skirt and the other immediately above the piston pin bosses. Another development involves the use of a flat invar strip projecting through opposite slots in the second ring groove and holding the ring out at a constant clearance in the cylinder. The strip, being centrally anchored to the head, holds the piston in permanent axial alignment with the cylinder. The skirt is slightly oval and expansion due to temperature rise increases the effective bearing area along the thrust axis. Removing the oil control ring from the skirt to above the piston pin with alloy pistons improves lubrication, especially in cold weather warming-up.

Aluminum alloy connecting rods are on the increase. Rigidity of the big end is assured in one instance by the use of a case-hardened steel cap. A duralumin cap in another case bears directly on the crank pin.

Crankcase and Cylinders Unit.—A foundry accomplishment, and resulting in extreme rigidity, is the casting of a V eight crankcase and cylinders in one unit. Replaceable steel-backed, babbit-lined main bearings are often line reamed after installation but progress in the fabrication (with limits as low as one quarter thousandth on some dimensions) allows their installation or replacement without any fitting. Cam shaft bearings of this type are appearing. Experiments are being conducted with a new type of steel for cam and crankshafts that does not require heat treatment. A copper-lead bearing compound is used by one bus manufacturer. It has no lining or backing, the structure being uniform throughout the shell. Shaft, cams and gear made separately and brazed together in an hydrogen atmosphere is a new development in welded cam shafts.

Oil capacities have been increased in some instances. The space below a false bottom and between numerous transverse ribs provides settling chambers in one lower crankcase. To assure a supply of oil regardless of engine inclination or oil viscosity, an inverted cup is placed over the vertical, cylindrical screen surrounding the pump intake of one engine. An instrument has been developed to give constant viscosity indications of the oil in the crankcase.

Cooling. — Thermostatically-operated, vertical vane radiator shutters replace the false radiator front. They are of full length and conform to the characteristic curvature of the radiator. When operated the vanes turn in from both sides. The increased power of present day engines is reflected in their greater water capacity. In place of even water distribution from the pump all the water in one engine goes to the rear of the block and then flows forward. One maker claims materially increased fan-belt life by the adoption of two narrow belts in place of the single wide one formerly used. For more favorable fan position behind the radiator, the combined fan and pump unit has been raised. The pump upper contour is often above the top of the block.

FUEL SYSTEMS AND MANIFOLDING

The down-draft carburetor is a conspicuous development of the year. Improved distribution and a cooler manifold are possible. The manifold can be of larger diameter, increasing volumetric efficiency. A drain is provided at the bottom of the manifold tee to prevent overloading in case of excessive choking. There is greater valve accessibility with the carburetor above the engine. Down-draft manifolding is also on the increase. One carburetor is provided with an extra high speed jet which cuts in at 50 M.P.H. Different carburetor calibrations are now provided on cars when going into low and high altitudes.

Automatic heat control valve consists of a butterfly valve in the exhaust manifold, weighted at its lower end to hold it normally closed, at which time the exhaust is by-passed through a jacket on the intake. As the engine speed increases the exhaust pressure opens the valve. The inlet manifolds on a bus engine are water-jacketed and the flow of water through them is controlled by a thermostat. This same engine draws air at atmospheric temperature from outside the hood or can be made to draw it from an exhaust stove.

Air cleaner of the copper ribbon type, oil wetted, is also an effective flame arrester in case of back-fire. Considerable spiralling of air through a cleaner upsets uniform distribution in the manifold. Great care must be exercised in the design of an air cleaner to straighten out the air flow before entering the carburetor. Cam shaft-driven fuel pumps are increasing, a new type involving a float and pressure chamber, the latter reacting on the former when the carburetor needle seats and prevents further pumping.

Speed Governors.—Due to operators running buses in the lower gears at excessive engine speeds, governors are being used to safeguard against these destructive speeds rather than the engine speed in high gear. To prevent high speed in factory drive-aways, governors are being installed which are removed when the car has reached its destination and returned to the factory for further use.

Tank Capacity.—Several cars have increased gasoline tank capacities. A vent in the center of the tank prevents spilling when turning corners. On one car the gasoline pipe line is carried outside the frame channel to expose it to the cooling air. A gas generator for fuel oil has been developed for buses. A Roots-type supercharger is available on one car.

CLUTCH

Ventilating covers are provided in the clutch compartment. In one case a duct from the outside is brought near the release bearing admitting air to relieve the vacuum created at the center of the revolving mechanism, thereby preventing lubricant being sucked into the clutch from the transmission. A new clutch design of the single plate type utilizes a full circle of steel stamped levers between the spring and pressure plate insuring uniform pressure. A number of radially disposed, laminated springs act as a cushion drive in the clutch hub.

TRANSMISSION

Indirect gear ratios have been slightly reduced to increase acceleration. The quest for quietness continues with finer pitch, and smaller diameters giving lower pitch line velocities. Internal gear reduction is increasing and ease of shifting is more pronounced by shortening every second out of three teeth of the sliding gear clutch, giving a combination tooth and dog effect. The customary latch-out of four speed transmissions is being eliminated by means of a spring-loaded plunger which requires additional side pressure to overcome. A four speed all-spur-gear type unit is used by one maker. A three speed transmission has appeared with built-up herringbone gears for the constant mesh and second speed trains, the latter having different pitches on the adjacent members. Horizontally disposed shafts are to be found in bus and front-drive designs for increased clearance. A new five speed truck type has appeared and a four speed bus transmission with second and third speed trains in constant mesh.

JOINTS AND AXLES

Universal Joint.—Front drive requires joints capable of swing through an included angle of at least 80°. A special design is required to insure uniform angular velocity. A compact double joint is used in one instance with the adjacent, aligned pins of the two joints secured to a central ring which always bisects the angle. Another design utilizes steel balls which roll in raceways ground in the joint yokes, the plane of the balls bisecting the joint angularity.

Rear Axle.—A dead rear axle, reminiscent of chain-drive days, reappears with the advent of front drives. A double roller chain is being experiment with by a manufacturer of chain driven trucks. A two speed axle appears in the form of an internal gear reduction unit ahead of the bevel pinion. A three quarter floating design replaces the full floating on two cars.

Front Axle.—Front-drive again revamps previous axle design. A tubular center member in one instance is offset forward to clear the differential housing and the ends are swedged into forged yokes whose king-pin centers are in line with the drive shafts. The center portion of the I-beam axle bed in another vehicle is offset forward in order to clear the worn housing.

BRAKES

While one maker returns to a 50% front and rear braking effort, another places the distribution at 60%—40%. A friction type servo unit for installation at the rear of the transmission has been developed as well as flexible cable connections to replace brake actuating rods and levers. Lead-tipped shoes as well as a lining with lead wire interwoven therein reduce scoring through a seemingly "lubricating" effect, dampen noise and aid in shedding water. The engine brakes through the front wheels on front drives. One design has the drums adjacent to the differential housing and acts through the universal-jointed shafts.

WHEELS AND TIRES

Improved swedged spokes and chromium plating characterize the increasingly popular wire wheel. Large chrome plated hubs are popular with wood wheels. While one maker replaces roller with ball bearings for the wheels, another moves oppositely. The heavier cars are going to small diameter rims, with tires such as 18″ by 7.00″. Inroads are being made by the balloon tire in the truck field.

SUSPENSION

The last adherent of the cantilever spring has dropped it. Spring shackles of the rubber bushed type are more popular. Springs heavily coated in graphite lubricant, wrapped with heavy canvass and provided with metal covers obviate any further need of interleaf lubrication. A new form of shock eliminator provides a shackle at the front of the left spring in place of the fixed mounting, its oscillation in both directions being restrained by helical springs under compression. Two parallel, quarter elliptic front springs at each side, the lower one being adjustable fore and aft by a fine thread for castor adjustment, provide a constant castor angle during spring deflection. Tests show that in striking an obstacle or when braking, the axle may rotate as a whole as much as 5° and with a wide wandering of the instantaneous center of rotation, thereby entirely upsetting the steering geometry. With the advent of front braking and driving, this is a serious matter. Front radius rods are another possibility.

FRAME

Increased channel depths and widths, the latter particularly where offsets occur, are noticeable. An X member is used near the center of several frames for rigidity. By placing a deep drop in the spring seat of the rear axle of one front-drive car, no frame kick-up is required.

CONTROL

Three-spoke steering wheels and the starter button on the instrument board are noticeable trends. While wheel-bases have been increased several inches, the turning circle on many cars has been decreased several feet. Decreased steering effort is obtained in the cam and lever gear by allowing rolling motion of the stud through its mounting in roller bearings. Pedals mounted separately from the power plant, a cable connection in place of a rod and the use of rubber in the gear shift lever mounting, aim to suppress noise transmission. A horizontal rod projecting through the instrument board with a knob on the up-turned offset provides the gear shift for front-drive cars.

EQUIPMENT

The metric spark plug is used more. A cover extends over the heads of some engines protecting the spark plugs. The double breaker type of ignition is more popular on six cylinder engines, one breaker serving the three front and the other the three rear cylinders. A new ignition lock is built into the coil and attached to the rear of the instrument board. Starters of the mechanical shift type have lower reduction ratios. One make with higher cranking speed uses an 18° advance beyond the normal driving range for starting because of better results in cold weather. The horn located in the center of the lamp tie rod is an innovation. Some cars are now provided for radio installation.

Headlights continue large. Head and tail light wires are entirely concealed. Parking lights are placed at the top of the front body pillars on one car but revival of this antiquity seems to have no place in a vehicle symbolizing speed. A combination tail and stop light utilizes a 21 c.p. bulb whose intensity is reduced by resistance in the circuit. Application of the footbrake short-circuits the resistance and the full intensity is used for "stop."

Hydraulic shock absorbers of the two-way type show increasing activity. A thermostatic valve consisting of a conical disc controlling the oil flow aperture provides consistent operation with varying climatic changes.

SHEET METAL AND BODY

Radiators.—Radiator shells on several cars have depressions in the sides, and sometimes on the top, finished in the body color while the raised portion is chromium plated. Radiator caps are so flat as to be almost invisible in some cases. Shutters make possible the V shaped, false front of a front-drive car. Longer and flatter hoods are the vogue. A series of triangular, wing-like groups following the upper fender line, each consisting of several curved louvres of increasing length, imparts to the vehicle the effect of motion, even while standing still. Vertical louvres are provided near the radiator in one case to permit dust sucked in through the radiator to be discharged there through. The hood hinge is continued across the cowl to the windshield in several plated, decorative designs.

Fenders hang lower over the wheels and have considerable sweep in the front-drive designs. In them are to be found exceptionally long, tapering hoods. Running boards are provided with curved edges to be continuous with the fender edge. Full length running board kick-pads are used. Rear gas tank covers extend to the fenders in order to fully cover the rear spring horns.

Body Design.—Overall body heights are generally lower, with extreme lowness in the front-drive cars. With them body designers have fresh possibilities, from new methods of terminating the front end to the lack of restrictions, including the kick-up in one car, at the rear end. Doors and body side panels are brought flush with the running board splashers in several cars. Increased seat width is obtained by flaring the bodies out slightly below the belt molding. Body panels are coated with a noise deadener, such as emulsified asphaltum, to eliminate drumming and provide heat insulation. Many joints between the wood frame members and metal braces have graphite-paper inserts to prevent squeaks. There is an increasing use of steel. There is a growing tendency for manufacturers to build their larger model in two wheel bases to give greater body variety. Several closed as well as open models provide contrasting-color panel effects in which the hood color is carried below a bead dropping down and rearwardly over the cowl and lingering along the bottom of the body.

Windshields are tilted slightly, about 7°, to avoid glare, following open-car history. Plated windshield and window frames are used. Opaqued glass is still used for sun visors while some employ individual adjustable flaps hinged to the roof above the front seats. Drop type rear windows aid ventilation. Due to the small depth over the wheelhouse in a low design, the rear quarter window is hinged in front and swings outwardly. Dual top cowl ventilators are popular, as well as top and side ones.

Roof Treatment.—There is an increasing use of the all-metal side roof shell replacing fabric. Roof treatment usually shows the side panels tapering in depth toward the front. The English sliding roof has been introduced. Replaceable chromium-plated body moldings, sliding over a steel strip spot welded to the body panels are an innovation, as are plated window moldings. The use of a single molding, about three inches wide, is displacing the widely spaced moldings with the belt between. One maker has eliminated the plated cowl band which has no rightful place where vertical lines should be suppressed.

Frame.—Many bodies are mounted on the frame on rubber shims for increased quietness. One maker uses rubber molded directly to a ⅛″ steel floor plate, the rubber extending beyond the plate to form a seal and also on the under side where the plate rests on the sill.

Seats and Springs.—A folding arm rest divides the rear seat into two sections when required. Two layers of springs are used in some seats, the lower being of fairly heavy stock to guard against major road unevenness while the light upper layer is form fitting and takes up minor deflections. A variety of seat adjusting means are provided such as a self-locking screw, a spring-loaded pin dropping into holes in a runway, or the use of several holes in the cushion frame into which fit lugs projecting from the seat pan. The latter is used for an adjustable rear seat.

NAVAL ARCHITECTURE AND MARINE ENGINEERING

By Boyd R. Alexander

Lieut. Commander, U. S. N., Bureau of Engineering, Navy Department

LIMITATION OF ARMAMENTS

The controversy which has for several years continued on the subject of Limitation of Armaments has tended to produce unsettled conditions in the fields of Naval Architecture and Marine Engineering. Hardly had the lessons of the Washington Arms Conference been incorporated in a projected building program when concerted attacks were launched by various social and political groups with a view to defeating this program. These attacks, based for the most part on economic considerations, came at a particularly inopportune time; for the designers, in an effort to embody maximum effectiveness within the weight limitations of the Washington Conference, had planned to use specially built and consequently very expensive apparatus. The realization that new construction costs would be considerably higher than previously anticipated, undoubtedly intensified the popular demand for further limitation of armaments. In response to this demand the President made representations to the principal Naval Powers, requesting the calling of another conference during the early months of 1930; and, in addition, as an evidence of good faith and sincerity on the part of the United States, suspended the construction of the three cruisers authorized by the last Congress to be started by the Navy Yards during the fiscal year 1929-1930. In view of the possibly radical effects upon naval strength and warship design, the results of the conference are awaited with intense interest.

THE LEXINGTON AND SARATOGA

Final speed trials of the *Lexington* and *Saratoga* took place during November and December, 1928. The results of the full speed trials were:

	Maximum Speed	Maximum S.H.P.	Maximum R.P.M.
Lexington	34.59	202,973	321.11
Saratoga	34.65	212,317	325.36

Defects Revealed.—The post trial examinations disclosed defects of design in several rows of blading, some of which have already been replaced, during October and November, 1929. The remainder of the defective blades will presumably be replaced by new design types during the spring overhaul, 1930, after which the vessels will, if the new blading is satisfactory, be finally accepted. It will be remembered that these vessels were built as an experiment. The power transmitted per shaft approaches very nearly the practical limit set by conservative engineers. The ships are very large, so large in fact as to present some interesting problems in berthing, fueling, maneuvering, and maintenance. There exists in some quarters a strong belief that smaller carriers would fulfill their military functions equally well and at the same time avoid the disadvantages (especially the cost and size) under which these vessels labor. Unquestionably these two ships have been of great service in the Fleet from which their absence would be seriously felt. Additional carriers are needed and Congress has already authorized one of smaller tonnage for construction starting during the current fiscal year.

BATTLESHIP MODERNIZATION

The program of major alterations to the thirteen pre-Jutland battleships has been continued in accordance with previous plans. The *Nevada* and *Oklahoma* were completed during August at a total cost of $13,600,000. Their places were immediately taken in the Navy Yards by the *Pennsylvania* and *Arizona* for the modernization of which Congress last year appropriated half of the authorized sum of $14,800,000. The work to be done is in general similar to that accomplished on the *Nevada* and *Oklahoma* and consists of the installing of additional protection against submarine and air attack, re-boilering and the installation of new geared high pressure and cruising turbines, the elevation of the turret guns, the raising of the secondary battery, the replacement of the anti-aircraft battery, the installation of new masts and modernized fire control together with various necessary miscellaneous repairs and alterations. The completion of work on these two vessels will leave only three battleships, namely the *New Mexico*, *Idaho*, and *Mississippi*, yet to be modernized. Plans have been prepared with a view to commencing work during 1931 provided the necessary authorization is made by Congress.

LIGHT CRUISERS

The *Salt Lake City* during November completed her contract trials, making a maximum of 32.7 knots at a shaft horsepower of 108,815. The remaining seven cruisers authorized during 1924 are expected to be delivered during 1930. Considerable uncertainty exists regarding the fifteen cruiser program adopted by Congress during the last session, due to the suspension, by executive order, of the construction of the three first Navy Yard vessels. It is possible that modifications in the delivery date will be made on account of the delay in building; it is also conceivable that the number of cruisers to be built will be revised after (and, if) the conclusions arrived at by the Arms Conference are adopted.

RECOMMISSIONING DESTROYERS

Due to the development of cracks in the steam and water drums of Yarrow boilers installed in sixty destroyers it was decided to decommission these vessels and to replace them with fifty-three destroyers and four light mine layers which have for some ten years been out of commission at Philadelphia and San Diego respectively. The crews and equipment are being transferred bodily from the old to the new vessels. Some interesting developments have taken place; for instance, the entire bridge structure of one vessel was moved over to another whose bridge was in poor condition; on other vessels, smokepipes were replaced by others which had not deteriorated to the same extent. No serious obstacles have been encountered so far and the present prospects are that the recommissioned vessels will be able within a few months to take their place in the Fleet with all necessary modern alterations accomplished. Of financial interest is the fact that the cost of recommissioning is now expected to be less than the upkeep cost of the old vessels so that the net result will be a reduction in the operating costs for the year.

SUBMARINE SAFETY DEVICES

The board of technical experts appointed for the purpose of making a study of submarine safety devices submitted during March, 1929, a comprehensive report in which were recommended, valves for air supply to and air evacuation from individual compartments, single action watertight doors in the main compartment bulkheads, quick operated door latches, alterations to hatches to permit escape of crew from either end compartment, provision of submarine escape apparatus, addition of navigational range lights, redesign of ventilation valves and many other items. The *S-4*, after being raised and towed to Boston, was converted to a submarine salvage hulk. This vessel has been used off the Virginia Capes and later in Key West waters in the making of tests of various types of submarine escape apparatus. The *S-22* and *S-29* are being fitted with extra strengthened main bulkheads designed to withstand full submergence pressure. These changes, involving a reduction in military effectiveness, are to be weighed carefully in comparison with sister ships during 1930. Tests of the submarine escape device popularly called "The Lung" and developed at the Washington Navy Yard have been continued from the *S-4* off Key West in depths up to the maximum safe submergence of the *S-4* or 200 feet. Further tests have also been made in the tank at Washington Navy Yard at pressures corresponding to a depth of 354 feet. The apparatus functioned satisfactorily in all cases. Additional tanks are under construction at New London for the instruction of submarine personnel.

MERCHANT MARINE

Jones-White Act.—The stimulating effect of the Jones-White Act on the construction of new ships and on the reconditioning and improving of ships already built was evident during the fiscal year. Favorable action has already been taken, or is pending, on loans involving nearly $75,000,000. It is confidently hoped and expected that a rapid increase in the number of vessels operating under the United States flag will be effected.

Sale of The United States Lines.—The sale of the last passenger lines operated by the United States Shipping Board was executed March 21, 1929. The United States Lines and the American Merchant Lines, comprising the *Leviathan* and ten other ships, were by the terms of this sale transferred to a company organized by P. W. Chapman and Co. Inc. under the name of "The United States Lines Inc." for the sum of $16,082,000. The purchasers agreed to operate these vessels for 10 years on a minimum schedule of 106 trans-Atlantic voyages per annum, and further agreed to construct prior to February 13, 1932, two new passenger vessels to make at least 13 voyages each per year under the United States Lines.

Shipping Board Diesel Conversion Program.—Three of the eight vessels included in the second group to be converted to Diesel propulsion were completed during the fiscal year 1929. The machinery of these three vessels differs from that of all others in the program, in that it consists of four Diesel electric generators and one main propulsion electric motor per vessel. Maneuvering of the vessel is accomplished by use of the main electric motor which can be started, stopped, reversed and regulated independent of the engine room personnel. Contracts have been entered into for the conversion of the remaining vessels of the program during 1930.

Pulverized Fuel.—The *S. S. Mercer* which, during the fiscal year 1928, was equipped to burn pulverized coal, has, by traveling over 55,000 miles, using pulverized fuel, demonstrated the reliability of this source of power. Several other installations have since been made, both in this country and in Great Britain, using similar apparatus. Several other types of equipment have been under test at the U. S. Navy Fuel Oil Testing Plant, Philadelphia, Pa. Some of these show promise of satisfactory performance and at least two of them have already been installed in vessels.

INTERNATIONAL CONFERENCE ON SAFETY OF LIFE AT SEA

Ship Construction.—The International Conference on Safety of Life at Sea convened at London, April 16 to May 31, 1929, for the revision of the Convention of 1914 for Safety of Life at Sea. Committees selected from the delegations from the eighteen represented nations drew up a convention of 66 articles. This Convention, in order to become effective, must be ratified by at least five nations prior to July 1, 1931, on and after which date it is binding upon the signatory nations. Among other matters, the Convention deals with ship construction under which is discussed (1) subdivision of ships, (2) structure and openings, (3) stability, and (4) voyages of new vessels constructed subsequent to July 1, 1931. With respect to existing ships, each nation is required to effect as far as practicable the increased standards of stability recommended. Details of watertight subdivisions, peak and machinery space bulkheads, rules for constructing and testing bulkheads, watertight decks, fire-resisting bulkheads, the openings in bulkheads and ship's sides, exits from compartments, pumping arrangements, etc., are dealt with in detail. A stability test is required for new ships, and initial and subsequent surveys for ships are specified.

Life Saving Appliances and Fire Detection and Extinction.—Under this are discussed life boats for passenger ships and additional buoyant apparatus. Specifically, it is required that there must be accommodation in boats for all persons on board and in addition buoyant apparatus for 25% of all persons on board. Methods of construction of life boats, means of ingress and egress for passengers, muster rolls and drills, are treated.

Radio Telegraphy.—All passenger ships and all cargo ships of over 1600 tons must now be fitted with radio installation. Automatic radio alarms meeting the requirements of the Washington Radio Telegraph Conference of 1927 are authorized.

Navigation.—Under this heading are treated the helm orders, alarm, distress and emergency signals, regulations for collision, radio aids to navigation, synchronized radio, underwater signals, sound apparatus, shore lights and collision regulations for aircraft on the surface of the water. It is difficult to visualize the full extent of the changes in hull and machinery design which will result from the strict application of the new rules promulgated for the safety of life at sea. The convention is believed to mark a distinct advance in safety standards of the world; architects and engineers are already planning to incorporate the new requirements in future designs of vessels.

THE ERSATZ-PREUSSEN

Considerable interest has been aroused by the announcement by the

German Admiralty of a new 10,000-ton armored cruiser whose military characteristics are reputed to be far in advance of those of any previous vessels of the same tonnage. This ship will carry 11″ guns and will make 26 knots with a shaft horsepower of 50,000 and a cruising radius of 10,000 miles. The utilization in this vessel of Diesel propulsion is the first attempt made to drive a large war vessel by heavy oil engines. If the experiment succeeds, it is probable that some interesting changes will be made in existing types of cruisers.

RESEARCH

During the year a great deal of research work has been accomplished. Among others, the following have been made the subject of special study; the behavior of various metals at elevated temperatures; the use of corrosion-resisting steel for turbine blading, for gasoline tanks, for soda lime containers for submarines, for bolts and nuts, for various castings; the value and uses of chromium plating; a new rubber compound for gas masks; the use of various compounds for better cleaning of the water side of boiler tubes; etc. In conclusion it may be remarked that the year 1929 has from every point of view been a year of progress; this is true despite the uncertainty as to the nature and extent of future Naval building programs.

COMMERCIAL MARINE ENGINEERING

By A. H. Jansson

Editor, *Marine Review*, Cleveland

SHIPBUILDING

U. S. Takes Second Place.—Shipbuilding increased greatly in American shipyards during the past year, and by the end of the year the United States had moved into second position (next to Great Britain) in shipbuilding. Earlier in the year the United States ranked seventh. This increase may seem sudden, but to the initiated it has been discounted since the passing of the Merchant Marine Act of 1928, popularly known as the Jones-White bill.

New Building under Mail Contracts.—The provisions of this law made it possible for the Post Office Department to offer long term contracts (ten years) to private American operators in certain specified overseas services. Since this law came into force 25 mail contracts calling for the annual payment to as many American companies of over $12,000,000 have been awarded. To improve the service under the terms of the mail contract these operators must within specified time place new and more suitable ships on the runs. Mail contracts already signed call for the building of nearly 50 vessels, some of these ocean liners of great size. In addition to these contracts already allowed, the Postmaster General asked for bids on fourteen overseas services, among which is that now served by the United States lines between New York and Europe. Requirements in regard to new building in these later contracts are much more extensive and elaborate than in the original contracts. It is estimated that 40 new vessels will be required, according to the terms of the new contracts, half within three years and the rest within ten years.

Tonnage Expenditure.—At first the total expenditure for this tonnage was estimated to be $250,000,000. In the case of the transatlantic line the requirements for new tonnage were so far-reaching that the present operator felt compelled to demur. As a result some modification in the Postmaster General's proposal is expected, so that the total expenditure for the 40 vessels including two super liners to run with the Leviathan will not be over $175,000,000.

NEW VESSELS

Dollar Line.—By the end of the year a number of large contracts for new ships had been awarded to various shipyards, among which were two ocean liners for the Dollar line of 23,000 gross tons each to cost something over $7,000,000 each to the Newport News Shipbuilding & Dry Dock Co. These vessels are to be propelled by turbine electric machinery developing 26,500 shaft horsepower and a speed of 20 knots.

Oceanic Steamship Co.—Two ocean liners 632 feet in length with a speed of 20½ knots have been ordered from the Bethlehem Shipbuilding Corp. by the Matson interests for the Oceanic Steamship Co. for the San Francisco-Sydney service. These vessels will be propelled by twin propellers, the main propelling machinery consisting of three turbines and a set of single reduction gears on each shaft. The maximum horsepower for each vessel is to be 25,000.

Export Steamship Co.—Four vessels with turbine reduction geared drive to accommodate 150 passengers and to give a speed of 16 knots have been contracted for by the Export Steamship Co. with the New York Shipbuilding Co. at Camden.

Grace Line.—A new liner for the Grace line was launched by the New York Shipbuilding Co. Nov. 14. This vessel of a maximum speed of 19 knots, is 504 feet 8 inches in length. Accommodations are provided for 170 first class passengers. The cargo capacity is 6900 tons. The motive power is turbine electric in twin screws. The shaft horsepower at each driving motor is 6300.

A Diesel Freighter.—A large diesel freighter named the *City of New York* was launched Oct. 19, at the yard of the Sun Shipbuilding & Dry Dock Co., Chester, Pa. This vessel is 470 feet 8 inches in length and is of 9400 tons deadweight. Her cost is somewhat over $2,000,000. The main propelling machinery consists of two Sun-Doxford opposed piston type diesel engines. The engines are double acting, solid injection, and will develop over 5,000 shaft horsepower. The speed of the new freighter is to be 13 knots. Luxurious accommodations are provided for 60 first class passengers. This vessel is being built for the New York to South Africa service and two additional vessels are to be built in the future for this service.

Atlantic, Gulf & West Indies.—The Bethlehem Shipbuilding Corp., on Sept. 10, received a contract involving about $2,500,000 from the Atlantic, Gulf & West Indies Steamship lines for an ocean liner to carry passengers and freight between New York and San Juan, Porto Rico. The proposed new liner is to be larger than the *Coamo*, the present flagship and she will make 16 knots, the machinery to be turbine reduction gears.

The Pennsylvania.—The past year saw the completion of the turbine electric liner *Pennsylvania*, third electric ship for the Panama Pacific line, between New York, San Diego, Los Angeles and San Francisco. Like her sister ships, the *California* and *Virginia* which were mentioned in this report last year, she was built by the Newport News Shipbuilding & Dry Dock Co. She sailed on her maiden voyage from New York on Oct. 19, with a full passenger list of 800. On her trial run her maximum speed was 19.3 knots. She is 613 feet 1½ inches in length overall, 80 feet in beam, 20,800 tons gross register and 33,375 tons displacement. She is propelled by twin screws, each propeller directly connected to an 8500 horsepower electric motor at approximately 110 revolutions per minute. Steam is furnished at about 350 pounds pressure by eight Babcock & Wilcox watertube boilers, equipped to burn oil.

Ward Line.—Two 20,000-ton vessels, also turbine electric drive, are under construction at the Newport News shipyard for the Ward line and when completed will be placed on the run from New York to Havana. These vessels are to have the high speed of 20 knots and will be the fastest ships ever constructed for this run.

Steel Yachts.—Orders were received for vessels of other classes, including freighters, revenue cutters, car-ferries, ferryboats besides hundreds of barges and car-floats of various sizes. Twenty-one large steel yachts were awarded to American shipyards during the year. One of the outstanding vessels of this class was the yacht

Viking built by the Newport News Shipbuilding & Dry Dock Co. for G. F. Baker of New York. A large vessel, she is able to weather any sea. Turbine electric drive is the mode of propulsion. A new ocean-going yacht said to be 345 feet in length was laid down at the Bath Iron Works for J. Pierpont Morgan. She is to be named like her predecessor, the *Corsair.*

Tankers.—Before the end of the year contracts had been placed for 20 tankers with a total of 200,000 deadweight tons. Ten additional vessels of this class were also under consideration.

Projected Super-Liners.—For some months during 1929, active work was carried on in the preliminary design for two super liners, faster, though not quite as large as the Leviathan. It is expected that bids will be taken on these two vessels sometime during the first quarter of 1930. In the meantime bids were requested towards the end of last year on two 22-knot, first cabin ships to be 705 feet long. The present tentative program includes two additional cabin liners and four large fast express freighters with accommodations for a few passengers.

GOVERNMENT AID

This spurt in shipbuilding could not have come about had it not been for the policy of the government not only in aiding by substantial support in the way of mail contracts and the low rate of interest on construction loan but also in placing the government merchant ships in strategic trade routes, thus breaking the way as it were for the private operator. A most important part taken by the government has been the constant reiteration in the technical and public press of the need of an American merchant marine and how such a merchant marine properly operated given aid and comfort by the government would find a field of profitable operation.

MACHINERY APPLICATION

Turbine Electric Drive.—No radical changes have occurred in marine engineering during the past year, but no year, it is safe to say, in recent times has witnessed such a wide successful practical application of comparatively recently developed machinery. Particular reference is made to the wide application of turbine electric drive with comparatively high pressure steam. Briefly this type of power consists of watertube boilers, burning oil providing steam at 350 pounds' pressure and with perhaps 200 degrees superheat, giving a total temperature of between 600 and 700 degrees Fahr. Steam so generated is used to drive turbine generators which in turn supply electric current for driving the main motors, directly connected to the propeller shaft. The basis of this type of drive is the reduction of the high speed efficient steam turbine to an economical propeller speed by means of electricity.

The Bremen.—The outstanding vessel of the year was the German liner *Bremen,* which arrived in New York July 22, after breaking all transatlantic records,—four days, 17 hours and 42 minutes from Cherbourg breakwater—making an average speed of 27.83 knots. This is remarkable and no less remarkable is the fact that the *Mauretania* of the Cunard line had previously held this record against all comers for 22 years. This speaks well for the skill of both British and German marine engineers. But the *Bremen,* nevertheless, represents a tremendous engineering advance. She is propelled by four screws. Each propeller which is in one casting of bronze and weighs 17 tons is connected through single reduction gears to one turbine set, consisting of high, intermediate and low with a total of 30,000 horsepower. There are special turbine elements for going astern. With all four turbines operating at full capacity, a total of 20,000 horsepower is developed. It can be demonstrated that the fuel burned for this tremendous power compares favorably with that burned for the 68,000 shaft horsepower of the *Mauretania* and the total amount of fuel for crossing the Atlantic is believed to be actually less by approximately 600 tons. The principle involved in this apparently impossible performance is the relative efficiencies of the turbines. The *Mauretania* has four direct connected turbines, operating at 195 revolutions per minute, whereas the power developing turbines of the *Bremen* operate at 1800 revolutions per minute, which is reduced to a propeller speed of 180 revolutions per minute by means of gearing. As turbines go, those on the *Mauretania* operating at an unfavorably low speed are very inefficient, whereas the turbines on the *Bremen*, operating at a much more favorable speed are highly efficient.

German ingenuity has entered into the design and construction of the *Bremen* and her sister ship, *Europa*, which except for an unfortunate fire, would have been ready at the same time and will now probably enter service early in 1930. Extensive model tests were carried out, resulting in the choice of a fine and special form of hull with a small block coefficient. The fore body is characterized by the bulbous bow which means that there is a distribution of displacement at the extreme forward end of the ship below the water line. This principle was discovered by Rear Admiral D. W. Taylor, U.S.N., retired, many years ago at the Washington model basin. Lines having these characteristics have long been used for American warships and in a number of merchant ships. For the *Bremen* a modified Maier form of lines was adopted for the afterbody and particular attention was given to the shape and position of the propeller shaft bossings. The arrangement of the stern and the rudder post and the adoption of the Oertz streamline rudder, all probably had their effect on the speed of this vessel. No bilge keels are used and anti-rolling tanks of the Frahm types are fitted, thus lessening resistance and at the same time obtaining the benefits of reduced rolling. Particular attention was paid to wind resistance. Every feature of the shape of the hull and superstructure is shaped with the view of decreasing resistance from this source. The shape of the stacks follows closely the aerofoil section. Peculiarly enough, below the waterline the plating is lapped forward instead of aft. Though this means that the plating edge presents an appreciable face to the water, it is said that by so doing the water is kept from the side of the ship and thus resistance is reduced. No doubt considerable horsepower has been saved by careful determination of the easiest driving shape of hull, streamline superstructure and other refinements mentioned but there remains still another factor, an appreciable lightening of the vessel by the use of high tensile steel throughout. For the marine engineer and naval architect the *Bremen* deserves the most careful study before approaching the problem of how to build a similar or superior vessel.

Diesel drive for ships was not adopted to the extent its importance elsewhere in the world would seem to justify. The last of the eight steam freighters converted by the shipping board to diesel drive was completed during the year. Each of these vessels had been fitted with a single diesel engine of from 3500 to 4000 horsepower. There can be no question but that there was a distinct improvement in the motive power of these eight vessels over the original twelve that were converted to diesel drive. The performance of these eight vessels in long voyage services is likely to demonstrate clearly in a practical way, the economic value of the diesel engine in vessels of this kind and the American operator will then appreciate the economic necessity of the adoption of this type of drive if he is to compete in world markets. In smaller vessels up to about 1200 horsepower the diesel engine has found a greater and greater application. In tugboats, smaller freight boats, river and harbor tankers, in dredges and in fact in all types of smaller craft unless steam is required for some special purpose the diesel or internal combustion engine completely predominates. In world construction this type of power is now being installed in 54 per cent of all new construction at present under way. For certain services and certain types of vessels the internal combustion engine seems destined to be economically superior when everything has been taken into account.

Contra propellers, guide vanes and streamline rudders continued during the year to show marked progress in application. It has been demonstrated that an increase in efficiency is possible by the adoption of these devices. Electrification of auxiliaries is now a definitely established feature on shipboard and is a decided improvement in economy and practical operation. With the large new program in shipbuilding in the United States under way continued improvement may be looked for in all features of marine engineering. And in this improvement it may be confidently expected that the United States will take a leading position.

MATERIALS OF ENGINEERING AND CONSTRUCTION

BY C. LAURENCE WARWICK

SECRETARY-TREASURER, AMERICAN SOCIETY FOR TESTING MATERIALS

INTRODUCTION

The student of engineering materials to-day, if he would understand the real significance of their properties and their behavior under various conditions, can no longer be content to study them as he sees and uses them. Chemical analyses and the usual physical tests must be supplemented by some of the modern tools of science. Microphotography in the short space of two decades has revolutionized the science of metallurgy and its hand maiden, metallography. The development of the ultra-violet microscope and photography at high magnifications (up to 5,000 diameters), together with examination of materials under the X-ray (see THE AMERICAN YEAR BOOK, 1927, pp. 579, 581) has made possible the study of arrangement of atoms in the crystal structure. But ultimately the student must delve still deeper into Nature's secrets; he must study atomic structure and seek to learn its influence on the properties of materials. Thus. Dr. Saul Dushman tells us in the Edgar Marburg Lecture before the American Society for Testing Materials (*Proceedings*, vol. 29, II, p. 7, 1929) that it is possible to show a relationship between at least four cohesional properties—density, latent heat of evaporation, coefficients of expansion and compressibility—of certain elements and the electronic configuration of the atoms. While a theory of cohesion in solids based upon atomic structure has not yet been formulated, it is possible to calculate the magnitude of cohesive forces by introducing plausible assumptions regarding the laws of attraction and repulsion between atoms. Ductility and malleability are found to be intimately dependent upon the type of lattice structure. By analogy with effect of temperature on the rate of grain growth, rate of diffusion, electrolytic conductivity of salts, viscosity of glass, rate of flow of metals, each of which changes rapidly with temperature, Dushman has been able to determine the relative magnitude of cohesive forces involved. Thus is the physicist providing the engineer with new scientific methods of studying his materials, and he would be a courageous man who would attempt to predict the ultimate practical significance of this seemingly ultra-scientific approach to the properties of materials.

A development along entirely different lines is worthy of record. Modern mathematical statistical theory, while long applied in the field of life insurance, is just beginning to be applied to engineering problems, such as research, design, production, inspection, supply and methods of sampling and control. For example, the results of engineering research are usually expressed as averages and errors of averages, but engineering methods of calculating such errors have not kept pace with statistical theory, whereby it is possible to express technical data more concisely and more accurately than by present-day methods. In the estimation of safety factors to allow for the happening of the unexpected, in the setting of engineering standards where the underlying experimental data may show considerable dispersion, and in the control of production, inspection and supply of materials and parts, there are opportunities for economies in operation that may be quite large and that have been definitely proven in the telephone industry. (*Economic Aspects of Engineering Applications of Statistical Methods*, W. A. Shewhart, Bell Telephone Laboratories, Inc.)

METALS

Cast Iron.—There has not been the same progress in the classification and determination of physical properties of cast irons as there has been for steel; nor has accurate information on cast iron been widely disseminated in the engineering profession. As a consequence, the engineer has frequently looked with suspicion on cast iron as an engineering material. In recent years, however, considerable progress has been made in cast-iron metallurgy, so that irons with high physical properties are available to industry. The subject is discussed in a Symposium on Physical Properties of Cast Iron (Am. Soc. Testing Mats., *Proceedings*, vol. 29, II, p. 65, 1929), dealing mainly with effect of section and chemical composition on the physical properties, elastic and fatigue properties, static strength, impact and wear tests, machineability, corrosion and heat treatment of cast iron. A primary classification of cast iron based upon chemical analysis and a secondary classification based upon cooling rate are advocated. The importance of adding alloying elements, such as nickel and chromium, is stressed. Such alloying elements produce considerable increase in relative value of properties of steel, and since cast iron is essentially a steel whose continuity is broken up by free graphite, it is to be expected that certain alloying elements should produce a like improvement in cast iron. It is being found, too, that cast iron is amenable to heat treatment processes. Much time and effort is being devoted to the study of this rather complicated subject, which seems certain to be of distinct economic value.

Corrosion.—The study by F. N. Speller of effect of inhibitors in preventing corrosion-fatigue mentioned last year (see THE AMERICAN YEAR BOOK, 1928, p. 628) has been extended to include a study of the action of chloride concentrations and inhibitors on corrosion-fatigue of "stainless" steel (Am. Soc. Testing Mats., *Proceedings*, vol. 29, II, p. 238, 1929). The maintenance of a protective film seems to be essential to protection against corrosion-fatigue as well as against stressless corrosion. It is thought that rust-resisting steels owe their high corrosion resistance to the stability of the passive film formed. Stress and localized corrosion tend to damage these protective films and greatly reduce the life of the metal. Stress breaks the surface film and brings into play electrolytic factors tending to cause concentrated corrosion at the most strained part, but stress by itself probably plays only a minor part directly in accelerating corrosion.

Much is being added to our knowledge of corrosion and corrosion-fatigue phenomena through the investigations of D. J. McAdam, Jr. (see THE AMERICAN YEAR BOOK, 1926, p. 828; 1927, p. 578; 1928, p. 628). Current references are Am. Inst. Mining and Metallurgical Engrs., *Transactions*, 1929; also Am. Soc. Testing Mats., *Proceedings*, vol. 29, II, p. 250, 1929.

The aluminum-copper alloy commonly known as "duralumin," an important material in aircraft construction, occasionally becomes weak and brittle in service. With the increasing demands imposed upon modern aircraft materials, the question of their permanence is of increasing importance. An investigation of the permanence of duralumin sheet undertaken by the U. S. Bureau of Standards has greatly clarified the reasons for this undesirable behavior. H. S. Rawdon (Am. Soc. Testing Mats., *Proceedings*, vol. 29, II, p. 314, 1929) in reporting on part of these studies, which are still in progress, states that the corrosive attack on plain duralumin sheet was found to be increased by static tension, although the increase over the attack on comparison unstressed material was not great. The attack on aluminum-coated duralumin sheet was found to be entirely negligible, even with severely corrosive conditions accompanied by relatively high tensile stress.

A comprehensive résumé of the many developments that have been made in improved corrosion and heat-resistant materials for use of the chemical engineer was presented in the September issue of *Chemical and Metallurgical Engineering.* The best industrial practice in the use, principally, of metals and alloys, but also of brick and cement, wood and stoneware, glass and enamel, rubber and plastics, is discussed by producer and user, but always with the requirements of the chemical engineer in mind. The review includes a series of valuable tables of chemical composition, physical properties, and temperature and corrosion data.

Fatigue.—Most of the data on fatigue properties of metals have been obtained on comparatively small specimens, usually less than ¾ in. in diameter, and engineers at times have questioned the application of these data in certain problems of full-size design. The relative non-uniformity of castings and of welded material, as compared with wrought metal, has also emphasized the need for fatigue tests of larger specimens. R. E. Peterson (Am. Soc. Testing Mats., *Proceedings*, vol. 29, II, p. 371, 1929) has developed apparatus and procedure for testing specimens up to 3 in. in diameter, permitting fatigue studies of such products as full-size shafting, welded parts, fillets, large scale-models and machine elements. This is of particular importance in its application to welding, which is very rapidly coming to the front.

J. B. Johnson and T. T. Oberg (Am. Soc. Testing Mats., *Proceedings*, vol. 29, II, p. 339, 1929) have added considerable valuable data to the still meager information on the fatigue resistance of aluminum alloys. In the past, the endurance limit of aluminum alloys has been assumed on the basis of about 300,000,000 cycles of stress, since this limit was considered satisfactory for most practical purposes but with modern aircraft equipment propeller may be subjected to over on billion alternations of stress in year's service. The determination o the allowable working stresses fo aircraft parts cannot be made on hypothetical basis; the enduranc characteristics are being used as basis for design and must be determined accurately. The results reporte by these experimenters indicate tha 500,000,000 cycles are insufficient t determine the endurance limit. It i believed the results indicate clearl that aluminum alloys are weakene by the application of a low stress fo several hundred million cycles.

A set of Abstracts of Articles o Fatigue of Metals Under Repeate Stress appearing in the technical pres from July 1, 1928, to June 30, 192 has been prepared by the A.S.T.M. Research Committee on Fatigue o Metals.

Nitriding.—One of the outstandin metallurgical developments in recen years is the evolution of a series o new alloy steels containing aluminu together with a method, known a "nitriding," of case-hardening the alloy steels by means of ammonia ga at low temperatures, 900 to 1,000° being the usual range (see Nitridin Symposium, Am. Soc. Steel Treatin *Transactions*, vol. XVI, No. 5, Octobe 1929). The present analysis range o steel for nitriding is chromium 0.80 1.30 per cent, aluminum 0.60 to 1.2 molybdenum 0.15 to 0.25, with var ing amounts of carbon. Alloy stee conforming to this particular ran were chosen because they showed t maximum surface hardness when e posed to ammonia gas under defini conditions. Furthermore, this har ness is retained at elevated temper tures and the specimens show marked resistance to atmospher fresh-water and salt-water corrosio The object of nitriding is to obta extraordinary surface hardness wit out producing warping or distorti of the surfaces of the treated articl The present practicability of t process is due to a thorough study the problem by Fry in Germany a subsequently by a number of investigators in this country and in France. The process offers the decided advantage that all heat treating of the articles is done before the nitriding. The equipment required consists of a suitable furnace provided with automatic temperature control, a gas-tight container made of a material such as chrome-iron, which will not be acted upon when exposed to ammonia at the nitriding temperature, and a supply tank of ammonia. In the process, the ammonia gas decomposes to a certain extent into nitrogen and hydrogen. The nitrogen, which is very active at the moment of decomposition of the gas, undoubtedly combines to a certain extent with the steel to form nitrides. These nitrides, which are in solid solution or in a fine state of dispersion in the case, impart extreme hardness to the surface of the steel, a hardness which gradually decreases inwardly until it corresponds to that of the core. The time of exposure of the articles to the action of the ammonia gas at the nitriding temperature varies from 2 to 90 hours, depending on the service to which the articles are to be subjected.

It has been amply demonstrated by different investigations that the hardness and wear resistance of nitrided parts are higher than those obtained by any other steel-treating process; that the physical properties of the case material are not changed by nitriding; that nitrided parts are free from internal stresses and therefore free from aging effects; and that increasing the nitriding temperature tends to increase the depth of penetration, but for temperatures higher than 975° F. generally decreases the hardness of the case. The nitriding operation was found to remove carbon from the steel, the amount removed increasing with the temperature of nitriding. There are many important potential applications of this material.

The effect of nickel has only been slightly investigated. Results by Robert Sergeson (Nitriding Symposium, *loc. cit.*, p. 145) point to nickel as retarding the nitriding. Nickel with chromium and aluminum, however, allows excellent surface hardness to be obtained, while nickel with molybdenum allows fair hardness but excellent penetration. Results suggest that further work should be done with the nickel combinations.

The future development of the nitriding process and a full realization of the nitriding phenomenon and its advantages over the older case-hardening methods can be brought about by the application of the basic sciences to the study of the problem. In determining the fundamentals involved in nitriding and their effect upon the commercial results, a large amount of work will be necessary in order to determine the best combination of temperature, time, pressures and analysis. The scientific study must be accompanied by practical tests in order to put the process on a sound economic basis.

Light-Weight Structural Alloys.—In many fields of mechanical production the demands of the present day are for less dead weight to be supported and fewer heavy parts to be handled and moved. Light metals and alloys are giving remarkable service in many lines and now give promise of providing equal service to structural and bridge engineers. This has been made possible by the development of processes for rolling large-size structural shapes of aluminum alloys (R. L. Streeter, *Engineering News-Record*, Sept. 26 and Oct. 3, 1929). One of the first difficulties encountered in the rolling of structural shapes was the obtaining of ingots of satisfactory metallurgical characteristics. Although the temperature employed in rolling alumnium is much lower than that in rolling steel, a more rigid temperature control is essential. It is interesting to note that the rolling of these strong alloys requires an appreciable increase in power as compared with steel. The shapes to be rolled will not differ a great deal in form from the structural shapes developed in the steel industry. Certain differences in the mechanical properties of steel and aluminum make it appear that minor revision or modification of proportions from those adopted for steel will be desirable in order to produce the most efficient sections with aluminum. One of the early applications of strong aluminum alloy as a structural material was made in a 10-ton bridge crane with a span of over 70 ft. Aside from the saving in operating expenses resulting from the lower power requirements of the aluminum crane, it was found possible to effect a substantial saving in the weight of the steel supporting columns and the crane girders.

Alloy-Steel Wires.—The failures of the wire in the cables of the Mount Hope and the Detroit suspension bridges during erection, which resulted in decisions to replace the cables on both bridges with new ones (*Engineering News-Record*, March 28, p. 516, and April 4, p. 564), are the first serious failures of bridge suspension systems in modern times. The most interesting and at the same time disconcerting fact is that the cables were made of a new type of heat-treated, galvanized, alloy-steel wire instead of the hard-drawn carbon steel wire in general use. In the manufacturing process, which was continuous, the wire after drawing was passed through a lead bath and oil quenched, the galvanizing process following as an integral step in the manufacture. Tests demonstrated that the heat-treated wire had the high modulus of elasticity of 29,000,000 lb. per sq. in. as compared with about 25,000,000 for cold-drawn wire, and excellent ductility in the usual tests was claimed by the manufacturers. Because of its high elastic limit, the wire does not take a permanent set when wound on 5-ft. blocks for shipment; conversely, when unwound it will lie straight on the ground. This feature was pointed out as contributing to ease of erection and as insurance against internal stress when the wire was made up in the cable. Another claimed advantage was that the increase in strength below the yield point makes possible the use of higher working stresses than have heretofore been used. Also, because of the increase in the modulus of elasticity, these higher stresses could be used without increasing the deflection.

At the present time it is difficul to arrive at any definite conclusio as to the cause of failure, until th whole case has been subjected to a exhaustive study and inquiry includ ing full examination of the wire b physical and metallurgical methods There are, of course, several possibl explanations of the failure. Th trouble may have been caused by som error in the handling of the wire dur ing the erection of the cable strand that failed, while no such error wa made with the others. On the othe hand, it may be that the sources o the failures will be found in some spe cial factors operating in the manufac ture and treatment of the batches o wire that failed. An impartial stud of the failure is being made by th U. S. Bureau of Standards.

Significance of Heat Treatment.— An outstanding feature of the pas year has been the tendency to a fairl general agreement as to principles o heat treating, especially heat treatin of iron and steel. An excellent exam ple is the concise statement of th "Principles of the Heat Treatment o Steel" prepared by the U. S. Burea of Standards (Am. Soc. Steel Treat ing, *Transactions*, 1929). A recentl perfected method of successfully heat treating delicately constructed ai craft parts (*The Iron Age*, August 2 1929) has resulted in large saving in weight and improvement i strength and safety, as well as makin available the extensive and more e ficient use of high-grade alloys. Re finements in practice have come wit the application of rigid technical co trol and the improvements of appl ances for heat treating.

NON-METALS

Cement.—Specifications for cemen have been in the limelight during th past year or two because variou high-early-strength Portland cement have been on the market and have a tained an important position in spit of the absence of a recognized stan ard specification applicable to the Many tests with these cements ind cate that concrete made from them d velops much higher early strengt than for the standard brands of c ment for the same water-cement ratios and conditions of making, placing and curing. However, these special cements are comparatively new and experience with them is limited. The Committee on Cement (Am. Soc. Testing Mats., *Proceedings*, vol. 29, I, p. 258, 1929) has had this matter, which is one of national interest, under consideration for some time and it now appears that the committee will have a specification covering these cements available in the near future.

During the past year arrangements were completed by the Cement Committee (*loc. cit.*) for establishing at the U. S. Bureau of Standards a Reference Laboratory for Cement Testing. The need for the establishment of this laboratory was made evident last year (see THE AMERICAN YEAR BOOK, 1928, p. 632) when many discrepancies were noticed in the cement test results of the inter-laboratory series of comparative tests. This laboratory will not undertake to make check or arbitration tests on cement but will calibrate and certify cement-testing apparatus and will attempt to minimize the "human equation" in cement testing by expert instruction of the operators.

Concrete.—One is impressed with the tremendous volume of research that has taken place during the last two decades in the study of concrete; yet one is forced to admit how little is known of this material and the factors that influence its complex properties, most of which vary with time and other conditions. That the permanency of a concrete structure is dependent upon more than mere strength and rigidity, and that certain other properties are frequently of even greater importance in problems of design, is now appreciated. The customary conception of concrete has been something produced by taking a mass of aggregate and filling its interstices with mortar, which in turn was produced by taking a mass of sand and filling it with cement. A new conception of concrete has been advanced by F. R. McMillan (*Engineering News-Record*, April and May, 1929) which is just the reverse of this, that is, a batch of paste of fixed water-cement ratio is prepared and the aggregates are then embedded in the paste, the aggregates being considered essentially inert and the paste the active element, the concrete deriving its useful properties chiefly from the hardened cement-water paste.

The properties that the engineer must control to insure the ultimate usefulness of the concrete structure are the characteristics of the cement, the relative proportions of cement and water and the completeness of the chemical reaction between the cement and water. The two steps in the design of concrete mixtures to meet specific requirements are, first, the selection of the proportion of water and cement (the water-cement ratio) and the conditions of curing which will produce a paste to meet the requirements of strength and watertightness; and second, to find a combination of aggregates which, with the paste selected, will give a mixture that can be readily placed, but that will be of such plasticity that it will not segregate in handling or after it is in place. It is thus seen that the most suitable wetness of the paste and the best quantity and grading of the aggregates are not independent variables. They influence each other to a marked degree and any attempt to evaluate both variables by a single step is likely to fail in practice. One of the two variables must be fixed upon first, at least tentatively, and the other then determined from it, subject, perhaps, to a readjustment on second trial. In the practice of recent years the attempt was usually made to determine first the aggregate combination. McMillan by reversing this practice begins the concrete-making process with the active element,—the cement paste—to which the aggregates serve only as diluents and as body-forming additions. Other facts, of course, should not be lost sight of, there are differences between cements; aggregates differ; grading is not without vital meaning; and above all mixing, transporting, placing and curing must be done with care and excellence. All these are vitally important matters, but they are matters that the able engineer and concrete-worker will find no difficulty in handling satisfactorily.

As usual, there have been reported during the year the results of many researches into the properties of concrete. R. E. Davis and G. E. Troxell (Am. Concrete Inst. *Proceedings*, vol. XXV, p. 210, 1929) reports on studies of volume changes in concrete and concrete masonry over a five year period. These investigators have also reported (Am. Soc. Testing Mats., *Proceedings*, vol. 29, II, p. 678, 1929) on the effect of richness of mix, age and repeated loads on the modulus of elasticity and Poisson's ratio of concrete. Among other things, it is shown that the modulus of elasticity is less for a concrete when dry than when wet, under a sustained load is greatest immediately upon application of load and continues to decrease for a long period of time, is not necessarily highest for the richest mix and strongest concrete, and increases quite rapidly with the age of the concrete for the first year but after three years the increase with time is small. Poisson's ratio is greater for low stresses than for higher ones, it increases somewhat with age up to about 1½ years, after which it remains nearly constant, and does not seem to be influenced by strength of concrete or by richness of mix.

A great deal of interest has been shown recently in the use of powdered admixtures in concrete. A paper by Duff A. Abrams (Am. Soc. Testing Mats., *Proceedings*, vol. 29, II, p. 618, 1929), describing studies of the effect of seven commercial and seven noncommercial admixtures on concrete of a type generally used in road construction, aroused quite a bit of interest and active discussion and incidentally emphasized the lack of knowledge of what workability is and how many qualities are involved in its measurement. While Abrams contends that none of the admixtures tested improved the workability as measured by the flow test, this is refuted by the admixture manufacturers with the major argument that admixtures increase the workability of concrete regardless of flow-table figures, and that strength is a secondary factor.

Mineral Aggregates.—Mineral aggregates, such as sand, stone, grave and slag, constitute a most importan material of construction, being use as railroad ballast, in sewage an filter beds, in bituminous and cemen concrete, mortar and plaster. Muc valuable information about these materials was assembled in a Symposiun on Mineral Aggregates (Am. Soc Testing Mats., *Proceedings*, vol. 29 II, p. 740, 1929), which dealt wit the desired properties of both fin and coarse aggregate for these uses In particular, the influence of aggregates upon the stability, durabilit and strength of both cement and bituminous concrete was shown. The fir resistance of concrete made from various coarse aggregates differs markedly, the order of excellence bein stated as (1) calcareous, (2) feldspathic, (3) granite and sandston and (4) siliceous aggregates. Sewag disposal trickling filters impose a ver severe service on mineral aggregate of which they are constructed; prope sizing, cleanness and durability o aggregate are the principal requirements.

Fundamental knowledge of th properties and uses of mineral aggregates has not kept pace with th actual use of such material in practice. In a sense, research in this fiel has only been started. There is nee for a correlating agency to review an analyze the existing test data as we as to coördinate future researches.

Brick.—As a continuation of research on brick and brick masonr reported last year (see THE AMERICAN YEAR BOOK, 1928, p. 634), studie on the relation of water absorptio to the penetrability and frost actio of building brick are reported by J W. McBurney (Am. Soc. Testin Mats., *Proceedings*, vol. 29, II, p. 71 1929). He concludes that the wate absorption or apparent porosity o brick is not a measure of resistanc to climatic action except for simila raw materials or methods of manufacture. However, for the same cla or shale and for the same method o forming, the difference between satisfactory and unsatisfactory weatherin performance may usually be distin guished by difference in water absorption. The opinion is offered, on the basis of field observations compared with the known water absorption and penetrability of the units used, that there is very little correlation between these properties and the transmission of water through masonry. It is pointed out that minute openings in walls, such as defective joints, are important factors and are much more likely to be the cause of dampness on interior surfaces than the penetrability of the bricks.

Miscellaneous.—Data on physical properties of cast stone have been compiled by J. Tucker, Jr., and G. W. Walker (Am. Concrete Inst., *Proceedings*, vol. XXV, p. 501, 1929) with a view to the development of much needed specifications for this product, the use of which as a substitute for natural stone has been increasing tremendously, influenced in part by its economy.

Fire tests of wall construction built of hollow load-bearing wall tile made at the U. S. Bureau of Standards (Paper No. 37, *Journal of Research*, vol. 2, January, 1929) have added considerable information on the fire-resisting properties of hollow tile.

Caulking compounds, consisting chiefly of inert fillers mixed with oil, for use in exposed masonry joints to prevent water intrusion were investigated by H. H. Dutton (Am. Soc. Testing Mats., *Proceedings*, vol. 29, II, p. 954, 1929) who states that only a few of the available commercial compounds have the necessary adhesiveness, elasticity and permanence.

TESTING

Bend Testing.—There is room for improvement in the present-day methods of making the bend test of metal specimens, due in part to the fact that stress concentration exists at the point of contact with the pin or tup around which the specimen is bent. The fact that there is no relation between angle of bend and fiber elongation has proved to be a handicap in applying this test in any precise way, such as is desired in testing the ductility of welds. A modification of the usual bend test is described by W. A. Slater and G. A. Smith (Am. Soc. Testing Mats., *Proceedings*, vol. 29, II, p. 183, 1929). Another method is described ("Report of Section on Bend Testing," *ibid.*, vol. 29, I, p. 492, 1929) in which the specimen is bent by means of couples at the ends without restraint by pins or other means at the point of maximum bending. The consistency of results with this test is very satisfactory; not only do similar specimens of a given material give the same results but the same material when tested in various thicknesses gives the same results, showing that the test measures inherent properties of the material rather than a composite of its properties and geometric form.

Fire Resistance of Wood.—A new laboratory test, using a fire-tube apparatus developed by the Forest Products Laboratory in an attempt to find a satisfactory numerical measure of the resistance of wood to combustion and particularly of its resistance to the spread of flame and to a rise in temperature, is described by T. R. Truax and C. A. Harrison (Am. Soc. Testing Mats., *Proceedings*, vol. 29, II, p. 973, 1929). Tests made with this new method in comparison with the shavings, crib and timber tests give more consistent and accurate results both as regards boards of the same treatment and boards treated with different amounts of fire retardant. This test has especial practical significance in determining the merits of various fire-retardant treatments now on the market.

Performance Testing.—Methods of testing rubber compounds by measuring their actual performance (*e.g.*, resistance to aging, abrasion and pounding) instead of chemical characteristics of the compound (see THE AMERICAN YEAR BOOK, 1927, p. 581) have developed to a higher stage of usefulness than is generally recognized. H. A. Depew and E. G. Snyder (Am. Soc. Testing Mats., *Proceedings*, vol. 29, II, p. 962, 1929) believe it is now possible to evaluate such compounds for various types of service, as in automobile tires, by the use of such performance tests and generally some other direct simple test that applies specifically to the product and service.

Testing of Materials Used in Natural State.—To-day there is an insistent demand for the latest and most approved methods of manufacture, but he who deals in natural products such as slate and building stone must accept what Nature herself has manufactured. For the group of natural products having fixed and unchangeable properties, the first task is to gain an intimate knowledge of chemical and mineralogical composition, impurities, structure, texture, hardness, durability and strength; and the second step is to set up standards of performance for each individual use and to determine the properties of the various natural products in relation to these uses in order that manufacturers may make an intelligent selection, and that the consumer may have a definite measuring stick by which to determine the suitability of the product that he buys. Oliver Bowles (Am. Soc. Testing Mats., *Proceedings*, vol. 29, II, p. 902, 1929) discusses some of the fundamental factors in the testing of mineral products with specific reference to slate and related materials and stresses the importance of testing and classifying these natural products so they may be used to the best advantage economically.

STANDARDIZATION

Normal progress was made in the standardization activities of the American Society for Testing Materials, which devotes its major energies to the study of materials of engineering. Twenty new specifications and tests were prepared covering such products as heat-treated helical springs, gray-iron castings for valves and fittings, soluble nitrocellulose and several paint solvents, gravel for bituminous concrete and asphalt for constructing roof coverings; a number of test methods covering paints and oils, coal and coke and waterproofing and roofing materials. Important contributions of especial interest were the new accelerated life test for electrical heating materials and the hardness test for soft rubber. In order to keep abreast of current practice the Society also made revisions in 19 of its standards and advanced 32 existing tentative standards to standard. Of these, the first national standard specifications for steel castings and for pipe for high-temperature service are of outstanding importance. A number of the structural steel specifications were revised to include a requirement for copper when copper steel is specified. An important contribution to the textile field was the adoption of the first national specification for a textile material, carded American tire cord, for a specific use and the development of new specifications for chafer tire fabrics and asbestos yarns for electrical purposes. (See *Index* to American Society for Testing Materials—Standards and Tentative Standards, 1929.)

INDUSTRIAL STANDARDIZATION

By P. G. Agnew

American Standards Association, New York

AFFILIATION AND COÖPERATION

American and International Standards Associations.—The affiliation of the American Standards Association with the International Standards Association at the end of 1929 was one of the most significant events in the standardization movement during the past year. Standardization, to be effective, depends upon wide-spread coöperation among all those who use standards. The great degree of success of standardization in this country has resulted largely from the coöperation which has been made possible by the large number of national trade associations and technical societies.

Need of Uniform Standards.—The advantages which have been gained through standardization can, however, be still further extended when certain types of standards become internationally—rather than nationally—effective. It will be distinctly to the advantage of the American exporters, for example, when standards for various types of machine tools or machine parts are uniform throughout the world, so that different dimensions would not be necessary for each country to which an exporter ships machine tools or parts.

Progress in Coöperation.—While it it is not expected that a large number of international standards will be established in the near future, it is probable that a far greater degree of coöperation in standardization work among the industrial nations will result from the membership of the American Standards Association in the international body. In addition to the American body, the members of the International Standards Association are: Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Germany, Holland, Hungary, Italy, Japan, Norway, Poland, Russia, Sweden and Switzerland.

MANUFACTURING STANDARDS

Increased Use.—In this country there has been rapid increase in the use of standards in manufacturing in the basic industries, such as farming, and in the use of standards and specifications in purchasing, not only by industrial establishments, but also by retailers, hospitals, municipalities and even by the individual ultimate consumer. The increased use of standards in manufacturing has been especially pronounced in a very old industry—textiles, and in two very new industries—radio and airplanes.

Textile Situation.—Chiefly because of its many centuries of tradition, the textile industry has, largely unconsciously, strongly resisted the replacement of the old, haphazard non-standard practices and products by technically sound industrial standards based upon careful research. The movement for the establishment of standards in the textile industry has come not entirely from within the industry itself, but largely from the outside—from the women who buy the products of the industry, sheets, blankets and dresses, and who wish to know precisely what they are purchasing. There are now going forward under the auspices of the American Standards Association two textile projects—for sheets and sheeting, and for blankets, both of these initiated at the request of the American Home Economics Association. The industry itself, with the aid of outside groups, is at present making a serious effort to establish standards for weighted silk fabrics. Such movements as these, involving as they must some internal changes and adjustments result, in the long run, in definite benefits to both the industry and the consumer.

The radio and airplane industries faced a far different problem. With little obstructing tradition, but with a multiplicity of methods and designs resulting from early development work, they have set themselves the task of crystallizing their experience into such standards as will make possible the advantages of large scale production without hampering further technical research and development. A great degree of valuable standardization has already been achieved in the radio industry, and many worth while projects are under way in the airplane industry. One of the most valuable types of standardization in these industries, which is certain to aid their technical progress, is the standardization of nomenclature.

STANDARDS IN FARMING

During the past year agricultural leaders have repeatedly urged the establishment and use of standards in farming. Secretary of Agriculture Hyde recently urged agricultural standardization as one of the principal means of placing agriculture on a par with other industries. The newspapers have reported that the standardization of cotton variations in 1929 has affected more than 250,000 acres, nearly double the area affected in 1928. Through standardization, 8000 farmers in 115 communities, have been able to pool their product and sell according to grade and staple. The standardization of agricultural machinery has also aided during the past year in making modern industrial methods available to the farmer.

STANDARDIZATION AND SPECIFICATION TECHNIQUE

Purchasing.—It is in purchasing, perhaps, that the growing use of the standardization and specification technique has been most marked. The United States Government, particularly the Navy Department, has been a leader in purchases by specification and is now developing a new technique which promises, during the next few years, to place purchasing upon a sounder technical basis than it is at the present time. The Navy Department has developed for many of its purchases what are known as performance specifications; that is, instead of specifying merely that a product shall contain such and such materials having a certain strength, the Department specifies that the products shall be usable under certain conditions for a certain number of hours. The Department has developed the machinery for making the rather elaborate tests necessary for purchase on the basis of performance, and it has found the effort expended well repaid.

Performance Specifications.—The use of performance specifications is not possible for all products, but it is likely that a very large number of types of products will be purchased, both by the government and by large corporations, in the future, under performance specifications. Many such specifications will be usable even by comparatively small plants.

Federal Specifications in Cities.—Several American municipalities are now saving thousands of dollars annually by using the specifications supplied by the federal government, and other specifications in their purchasing. The Purchasing Department of the City of Milwaukee has done notable work in this respect, making many of its purchases on the basis of performance specifications.

Retail department stores and mail order houses report very great aggregate savings through the establishment of standards for their supply items, such as paper, boxes and twine. Through the use of standards it has been possible to substitute, often at a lower price, paper and boxes which will not break under reasonably careful handling, for paper and boxes which might, or might not break, a source of great loss annually.

Consumer Demand.—In some department stores, there has also been evident a trend toward purchasing some of the items to be sold to the stores' customers in accordance with definite standards. Although no great progress has as yet been made in this field, it is believed that increasing consumer demand for standards of quality will lead the department stores to make their own purchases and their own sales on the basis of these standards.

Quality and Economy.—It is now generally recognized that not only improved quality, but great savings to consumers, can be effected through the use of standards. The National Electrical Manufacturers' Association offers an excellent example of this. Three one-horse, general purpose motors, according to the association, now cost less than one similar motor in 1902. Another example is the one quarter horse-power washing machine motors which cost $25 in 1921 now sell for $9.50. These are some of the traceable results of standardization.

STUDY AND RESEARCH

National Industrial Conference Report.—The most thorough and comprehensive study of the standardization movement which has yet been made was published by the National Industrial Conference Board in the early part of 1929. The Board's report covers company standardization, standardization work of engineering and other technical societies, trade association standardization, the work of the American Standards Association and the foreign national standardization bodies, the national Bureau of Standards, and other organizations. The report also discusses savings through standardization, standardization in marketing technique, standardization as an aid in the stabilization of business, and standardization as it affects the ultimate consumer.

Trends and Comparisons.—One of the most important chapters of the report, "The Trend of Industrial Standardization," compares present conditions with pre-war conditions, and says: ". . . Where but a few scattered firms had standard departments before that time, the number now is rapidly approaching the one hundred mark in the United States alone. Where standardized practices were formerly the business of the individual department, standardization now occupies, in more and more firms, the position of a settled corporation policy. Where the occasional trade association gave part of its time and money to developing association standards before the War, there are now some 300 trade associations in the United States alone that have accepted standardization, in some form or other, as a settled and fairly well defined policy. . . . These associations have become so important that to a large extent they dominate the entire standardization movement. Where formerly technical standards were almost exclusively the product of the deliberation of the various engineering societies, engineers are now largely called upon to devise and draft standards for projects that are initiated, promoted and carried through under the auspices of private companies and trade associations."

Report of Committee on Recent Economic Changes.—Another of the most important economic publications of the year—the report of the Committee on Recent Economic Changes—points to standardization as one of the principal means of eliminating great wastes in industry and effecting other important economies, throughout the industrial and commercial structure.

GROWTH OF STANDARDIZATION

Trade Associations.—The rapid growth of the standardization work of trade associations has been reflected by the addition of trade associations to the membership of the American Standards Association. The new Member-Bodies added during 1929 are: Tap and Die Institute, Milling Cutter Society, Drill and Reamer Society, American Home Economics Association, Common Brick Manufacturers Association, and Laundryowners' National Association of the United States and Canada.

American Standards Association Directors.—The year also saw the completion of the reorganization of the American Standards Association, with the appointment of the association's first board of directors. This board of directors is composed chiefly of industrial executives and thus places the executive on a par with the engineer in the direction of the national industrial standardization movement.

New National Standards.—An important group of new national standards was completed under American Standards Association auspices during 1929. These include standards for radio, machine tools, electrical standards and national safety codes. The national standardization projects initiated during the year under American Standards Association auspices include the specifications for blankets, already mentioned, and a number of standards for mining and metallurgy.

National Standardization Agreement.—There may finally be recorded for the year of 1929 an agreement which is of great importance because it promises to permit the smooth running of national standardization activities. This agreement, ratified by the A.S.A. and the United States Bureau of Standards, defines the fields of activity and the inter-relations of the two bodies in the national movement as follows:

1. The American Standards Association is the agency through which standardization by trade associations, technical societies, and governmental agencies is advancing in the United States on a broadly national scale. The Association is maintained by a group of national organizations, industrial, technical, and governmental (at present 40 in number).

2. The Association imparts a definite status to standards which are prepared by industry in accordance with the Association's procedure,

through declaring them American Standards, after a consensus has been reached among the various groups substantially concerned—producers, consumers, distributors, and general interests.

3. The National Bureau of Standards, through its Division of Trade Standards, is acting as a centralizing agency for industrial and commercial groups requesting its coöperation in the adjustment, application, and promotion of standards that will facilitate production and marketing of the commodities which concern the requesting group. After proper acceptance of such standards by the interests immediately concerned, the Bureau publishes them as the "Commercial Standards" of those interests. Primarily, the effort of the Bureau is to serve those groups which have no satisfactory standardization facilities.

4. Since Commercial Standards are obviously of interest to groups immediately concerned with the manufacturing and marketing of specific commodities, such standards are not considered to have the same status as is imparted to standards approved as American Standards by the A. S. A., though it is hoped that some Commercial Standards will eventually receive such approval. Commercial Standards are temporary standards.

. . . .

7. The foregoing does not apply to Simplified Practice Recommendations, since the Bureau endeavors to keep the elimination of unnecessary varieties a separate function.

COMMERCIAL AVIATION

By Andrew F. Haiduck

Aeronautical Engineer, Bellanca Aircraft Corporation

AERONAUTICAL PROGRESS

The year 1929 has witnessed important developments in practically every phase of commercial aviation. Aeronautics has been brought before the public to an unprecedented degree by spectacular flights and the regularity of scheduled operations. Perhaps the most important developments of the year were the continued healthy growth and constructive reorganization of the entire industry and the universal adoption of the airplane as an integral part of our transportation system. The establishment of combined airplane and railroad passenger service from coast to coast in the United States is significant. Business concerns, banks and manufacturers were quick to recognize the value of the airplane as the swiftest of all transportation vehicles. Enormous savings in interest charges have been effected by the use of the air mail. Air transportation is also being used to speed up express shipments, and a large number of firms even own private planes for business use. Air transportation has already become indispensable to commerce and there is no doubt but that it will play a large part in our economic and social progress.

TECHNICAL DEVELOPMENTS AND TENDENCIES IN DESIGN

Plane Stability and Speed.—In keeping with the rapid pace of the industry there have been numerous notable advances in aircraft design and construction. Into the plane itself has been built much of the inherent stability hoped for and promised by aeronautical engineers for many years. Moreover this stability has not been obtained at the expense of maneuverability or controllability. A minimum of effort is required to fly the conventional monoplane or biplane of to-day because of its high degree of inherent stability. Another striking feature of the year's developments is the attainment of increased speed by nearly all types of commercial aircraft. This has been obtained by more careful attention to the aerodynamic efficiency and streamline qualities of the airplane. This increased efficiency was obtained in many cases by the use of the engine cowling developed by the National Advisory Committee for Aeronautics. An increase of maximum speed of 20 *mph* has been obtained in some cases with this cowling. Other significant developments are the increasing use of metal in propellers, fuselages and wings, the increasing number of multimotored transports and the development of the Diesel engine for aircraft.

Brakes and Landing Gear.—Brakes have practically become standard equipment on commercial planes. Not only does the brake installation greatly reduce the landing roll and take-off distance, but it facilitates maneuvering an airplane on the ground as the brakes are independent in action. Landing gears of the oleo-pneumatic and oleo-spring design too, are now being almost universally used.

Increased Use of Metal.—There is a general tendency to substitute metal for all parts of an airplane structure. In the majority of cases wings are still constructed of wood and fabric. However some manufacturers are developing the design and construction of all-metal planes. The general trend in this case is toward a thin dural skin which replaces the fabric and is capable of carrying a portion of the load imposed on the primary structure. Several such designs were already in use commercially at the end of the year.

New Engines.—The supply of war surplus engines practically exhausted, a large number of new engines were developed. Most of these were of the fixed radial air-cooled type primarily because this type has the advantages of high reliability, light weight and comparative ease of installation and maintenance. Several vertical in line engines made their appearance. The problem of noise in an airplane cabin has been conquered by extensive research by the Bureau of Standards of the sound deadening properties of various linings suitable for aircraft use. Strangely enough these linings are also excellent heat insulators for the cabin. The possible risk of fire in the air has now become practically negligible.

Airplane Design.—The two and three place open cockpit biplane still remained the most popular probably because of its low cost but the general trend in larger airplanes continues to be toward the monoplane and biplane cabin types.

AIR MAIL AND TRANSPORT

Scheduled air-mail and transport mileage in the United States has increased enormously. On Dec. 1, 1929, more than 90,000 miles were being flown per day over 36,577 miles of established airways. One third of this mileage was flown at night. At the end of October there were 32 United States air lines carrying express, 47 air lines carrying mail and 61 air lines carrying passengers. The growth in air mail has been most gratifying, having increased from 210,957 pounds, for June 1928, to 598,494 pounds for June 1929, or an increase of 284%. Scheduled operations for the past year have increased from 39,060 to 90,436 miles per day. A more detailed analysis of the progress of air mail and transport activities may be obtained from study of the tabulated data included herewith. Perhaps the most important development in passenger transportation during the past year has been the establishment of combined air and rail service. At the end of the year there were five transcontinental air-mail lines in daily operation from coast to coast. The trip from Los Angeles to New York can now be made in 44 hours, whereas the minimum time to complete such a journey by rail had been 102 hours. Large multimotored high speed transport planes equipped with every convenience including steward and dining service came into use, and every consideration was given to the safety and convenience of the traveler. Passengers are now riding in commodious cabins provided with adjustable reclining chairs and several large transports already have sleeping accommodations. The tendency toward larger airplanes is a natural development of passenger traffic development. The largest commercial landplane in the United States now seats thirty-two people.

MISCELLANEOUS AIR SERVICE

Scheduled operations in the United States comprised only one sixth of the civil flying for 1929, the remainder consisting of miscellaneous non-scheduled commercial services and private flying. Under services would come sightseeing, aerial photography, crop dusting, student instruction and taxi service. The instruction of students has increased enormously. At the beginning of the year there were 320 flying schools, whereas the number was over 600 at the end of the year. No authentic figures are available to show the progress of this class of flying but it is estimated that the mileage increased from 30,000,000 to 60,000,000 miles during 1928. The natural result of this field of flying has been the steady increase in the number of airports to take care of this traffic.

AIRPORTS AND AIRWAYS

At the close of the fiscal year ended June, 1929, there were 10,183 miles of lighted airways in operation, with 263 intermediate fields, 1,399 airway beacons, 164 airway weather reporting stations, 27 radio communication stations and 7 radio range beacons. The Airways Division of the Department of Commerce has started on the installation of an extensive system of national airways which bids fair to become almost as comprehensive as our national highway system.

Additional powerful revolving searchlight beacons with flushing courselight projectors for indicating the direction of the airway have been installed. Radio range beacons for guiding aircraft through storm or fog, radio marker beacons to tell the pilots their exact position on the airways, two-way radiotelephone, all have been developed and installed on the principal airways. Extensive research work has also been done under the direction of the Daniel Guggenheim Fund for the Promotion of Aeronautics toward the solution of the fog problem. All of these airways and navigational aids however would be useless if there were no airports. On Dec. 1, 1929, there were 1000 private commercial and municipal airports in the United States with an additional 1200 proposed or in the process of construction.

AIRPLANE PRODUCTION AND EXPORT

The production report compiled by the Aeronautical Chamber of Commerce shows an aggregate business on airplanes and engines of $38,035,000 for the first 6 months of 1929 as against $48,000,000 for the entire year of 1928. The figures indicate the increasing popularity of the cabin monoplane, seaplane and amphibion. All previous export records of American manufacturers were exceeded during the first nine months of the year. Aeronautical shipments to foreign countries for this period were 194% of the total for 1928. Engine exports were almost doubled, whereas the export of parts and accessories showed an increase of 35%. The figures for the export of aircraft, engines and accessories for the nine month period and 1928 are:

	1928	*9 months 1929*
Aircraft	1,759,653	4,397,311
Engines	664,926	1,127,090
Parts	1,240,244	1,606,515
Total	3,664,823	7,130,916

COMMERCIAL AVIATION IN EUROPE

Practically every important capital in Europe is now served by one or more airlines despite the handicap of a multiplicity of international borders. Special express services are now operated between London, Amsterdam, Hanover and Berlin; and between Paris, Cologne, Essen, Mulheim and Berlin. Passengers may start a journey by air or first-class railway and change to the other at will with but little informality. English interests maintain a regular passenger mail and express service between London and Paris, a distance of 225 miles making one to five round trips per day. Because of the rapid growth of air commerce in Europe, a number of excellent airports, three of which are famous, namely Croydon at London, Le Bourget at Paris and Templehof at Berlin have been established. Germany still leads in air transport mileage, with France second. The figures for other countries are given in the tabulated data following:

AIRWAY AND OPERATION MILEAGE

	Miles of Mail Airways	*Total Miles of Airways*	*Airplane Miles Scheduled Daily with Mails*	*Total Airplane Miles Scheduled Daily*
May 30, 1928	10,058	11,067	22,448	27,493
July 31, 1928	12,171	13,108	27,660	33,317
Aug. 31, 1928	11,921	13,133	25,288	32,042
Sept. 30, 1928	12,397	13,609	26,240	33,792
Oct. 31, 1928	12,397	14,941	28,204	40,602
Nov. 30, 1928	13,974	16,486	27,606	38,902
Dec. 31, 1928	14,155	16,667	27,848	39,060
Jan. 31, 1929	17,470	19,888	32,816	42,698
Feb. 28, 1929	17,470	20,788	38,045	53,345
Mar. 31, 1929	18,074	21,392	39,216	57,516
Apr. 30, 1929	19,022	22,778	40,472	57,453
May 31, 1929	19,721	25,336	41,929	62,265
June 30, 1929	22,165	29,227	48,068	69,029
July 31, 1929	24,088	32,196	52,070	74,970
Aug. 31, 1929				
Sept. 30, 1929	25,735	35,198	53,369	80,691
Oct. 31, 1929	26,537	37,037	50,843	91,162
Nov. 30, 1929	26,597	36,597	51,230	90,436

DEVELOPMENT OF AIR MAIL SERVICE

Year	*Air Mail Mileage Scheduled*	*Miles of U. S. Airways*	*Pounds of Air Mail*
1918	18,000	218	17,831
1919	166,843	930	230,251
1920	653,764	3,509	526,573
1921	1,819,978	3,509	1,120,852
1922	1,629,250	2,738	1,224,723
1923	1,644,457	2,842	1,696,896
1924	1,590,425	3,010	1,500,034
1925	2,160,022	2,813	232,513
1926		8,416	703,310
1927	5,656,642	8,223	1,452,426
1928	7,289,900	14,155	3,542,074
Jan.-June, 1929	6,200,794	26,597	3,142,652

AERONAUTICAL CHAMBER OF COMMERCE PRODUCTION REPORT

	1928	*Jan.-June, 1929*
Open monoplanes	171	144
Open biplanes	2,348	1,623
Cabin monoplanes	850	884
Cabin biplanes	69	17
Multimotored monoplanes	58	115
Multimotored biplanes	5	0
Seaplanes and flying boats	11	18
Amphibions	30	53
Total monoplanes	1,079	1,143
Total biplanes	2,422	1,640
Total seaplanes, flying boats and amphibions	41	71
Total number of planes	3,542	2,854
Total value of monoplanes	$8,738,683	$9,829,845
Total value of biplanes	$7,541,615	$5,421,902
Total value of seaplanes and amphibions	$914,000	$1,781,000
Total value of all types (commercial production)	$17,194,298	$17,032,747
Total value of all types (including military)		$23,685,572

COMMERCIAL ENGINE PRODUCTION

Horsepower	*Number Reported 1928*	*Number Reported Jan.-June, 1929*	*Total Value Jan.-June, 1929*
0-50	32	43	$ 33,540
50-100	237	509	482,500
100-200	182	1,001	2,141,750
200-300	924	480	1,391,800
300 and up	475	1,242	6,883,784
Total No. Reported	1,850	3,275	$10,923,374

	1928	*Jan.-June, 1929*
Total value commercial production	$8,936,725	$10,923,374
Total value, including military		14,349,375

AIR TRANSPORT MILEAGE OF THE WORLD

(To Nearest Thousand)

	1921	1922	1923	1924	1925	1926	1927	1928
Australia				263	353	418	344	412
Belgium				160	145	90	111	230
Colombia	54	128	184	168	182	302	328	577
Czechoslovakia				129	173	152	258	258
Denmark			56		127	127	117	103
Finland					32	58	105	163
France	1,460	1,738	2,104	2,264	2,928	3,244	3,755	4,345
Germany	1,028	843	448	984	3,076	3,816	6,190	6,345
Great Britain	225	717	943	936	862	840	873	1,024
Italy						325	815	1,236
Netherlands	217	246	336	448	640	530	720	1,008.
Poland		66	142	234	466	532	672	260
Russia		83	158	312	555	815	1,127	1,684
Sweden				100	216	212	207	200
United States	1,828	2,329	1,743	2,221	2,911	4,429	5,810	7,300

MISSISSIPPI RIVER FLOOD CONTROL

By Arthur E. Morgan

President, Antioch College

THE FLOOD CONTROL ACT

Authorization and Scope.—The Flood Control Act of May 15, 1928, approved a plan for flood protection in the Mississippi valley, as worked out by the Army Engineers during the last half of 1927, and appropriated $325,000,000 for its execution. This Act launched one of the greatest construction programs ever undertaken in this country. It covers a reach of 600 miles of valley floor, touches seven states, requires the moving of hundreds of millions of cubic yards of earth and the placing of many thousands of cubic yards of concrete, and calls for the expenditure of an average of more than $30,000,000 per year for a ten-year construction schedule. In order to meet this schedule the work must forge resistlessly ahead through the many difficulties and delays common to projects of such magnitude. It has been vigorously initiated by starting construction at various points between Cairo and the Gulf, as well as by making surveys and studies for the detailed elaboration of the plans and by making appraisals for rights of way and flood easements.

Features of the Plan.—The essential features of the plan are: 1. A river-side floodway along the west bank from Birds Point to New Madrid, Missouri; 2. A floodway from the Arkansas River along Boeuf River through the Tensas Basin to the mouth of the Red River; 3. A floodway from the Red River through the Atchafalaya Basin to the Gulf of Mexico; 4. A controlled relief spillway discharging from the Mississippi into Lake Pontchartrain just above New Orleans; 5. Improvement of the main river channel by setting back the levees at narrow places, by strengthening and moderately raising them where needed, and by placing bank revetment in some places. In respect to all but the last of these features the plan is a marked departure from the "levees only" policy, which was previously adhered to by the army engineers and the Mississippi River Commission as the only feasible method for controlling floods in the Mississippi valley.

PROBLEMS INVOLVED IN THE UNDERTAKING

Administrative and Constructior Complications.—The project not onlj is one of heroic proportions but it involves many intricate problems o organization, administration, finance legislative and legal complications technical engineering, and construction. Under the stress of popular demand for action, and the act of Congress, which appropriated $325,000,000 for work to be done under the direction of the army engineers, the latter have made a vigorous beginning with only a few months of preparation under conditions which would ordinarily demand years of planning and preliminary study.

Control Vested in War Department.—Questions of finance were in the main settled for the time being by the Federal appropriation. Organization and administrative problems were dealt with promptly by placing the entire project under the direct and sole control of the Chief of Engineers of the Army who reports to the Secretary of War. The unusual character of this absolute delegation of power was rather strikingly evidenced by a decision July 19, 1929, by U. S. Attorney General Wm. D. Mitchell to the effect that "this project is fixed and not subject to review or change by this administration." The essence of this ruling is that while the Chief of Engineers has power to change the plan, as must necessarily be done by addition, amplification, and revision, President Hoover has no power to inquire into the economy or desirability of such modifications.

Factors in Centralized Authority.—The great advantage of this unrestricted authority is the power to push the plans through to completion regardless of almost any question or difficulty. One of the disadvantages is that, in the great urge for results, some features of the plan may be forced into construction before there is opportunity for critical and mature consideration as to their effectiveness, safety, and economy. Another disadvantage may be the inherent feature of army discipline which dominates in a military organization. An instruction received by an army officer is a command from which there is no choice. It is his sole business to execute the command regardless of conditions or considerations. In the construction of great engineering works so widely separated and with such uncertain factors as obtain on the Mississippi project, it is obvious that conditions or situations continually will develop or change locally, requiring quick and flexible adjustments or adaptations, and which will not safely permit the blind carrying-out of orders. An effort to meet this disadvantage has already been made by putting into effect a decentralization plan suggested by the President. This plan apparently does not decrease the authority of the Chief of Engineers, but it places responsibility on the local engineers for all operations within their respective areas and, while they can make no changes of plan, it permits them to recommend changes for consideration.

Organization.—The organization, as at present constituted, comprises the five districts of the Western Division of the Army Engineers, each district engineer reporting to the Division Engineer, who is also chairman of the Mississippi River Commission. In order to make this set-up feasible without further legislation, the headquarters of the Mississippi River Commission have been moved to Vicksburg. These changes in organization make possible a centralized planning and decentralized execution which should prove very effective in prosecuting the project. The division engineer proposes to establish a new policy of recruiting the organization through the subordinate positions which, in the course of time, should greatly increase the effectiveness of the force.

RESPONSIBILITY OF FEDERAL GOVERNMENT

Precedent and Policy.—One of the most far-reaching effects of the legislation which committed the Federal Government to administrative and financial responsibility for Mississippi flood control, and one not generally sensed, is that Congress has committed the Government to a precedent of tremendous importance without having first developed a logical, or even a suitable, definite policy for dealing with such situations. Flood problems are increasing in number and seriousness almost in direct proportion to the increase of population and industrial and commercial development.

Problems Confronting Congress.—Congress will shortly be confronted with pleas for aid from all sections of the country. To say that the Mississippi flood was large and disastrous does not cover the situation. In 1913 the river valleys of Ohio and Indiana suffered a flood which cost twice as many lives as did that of the greatest Mississippi flood. A single flood wave in Florida in 1928 cost three times as many. And it cannot be questioned that the residents of the Mississippi valley had more definite knowledge of the fact that they were invading a flood plain than was the case in Ohio or in Florida. The Government must face squarely the need for a general policy in reference to flood control in order to deal promptly and justly with these problems.

Legal Questions.—In spite of the endorsement by Congress, the comprehensive powers given the Chief of Engineers for executing the plan, and the decision of the Attorney General that the plan is fixed and final, legal questions will be a continuing problem. Among the first to come up are those concerning damages to property owners. Judge B. G. Dawkins of the United States Court of the Western Louisiana District recently ruled that the Government, before using land for the Monroe Circle Levee construction, must make a deposit sufficient to cover damages to the landowners. This is in accord with an earlier decision by Judge Faris in favor of landowners in reference to the Bird Point-New Madrid floodway levee in Missouri. The Boeuf floodway injunction case just heard by Judge Dawkins will decide whether or not a permanent injunction shall delay the construction of the Boeuf floodway.

Damages to Land Owners.—Some of the objections to this floodway are based on the fact that the plan does not contemplate paying damages to owners of lands in the floodway. Much testimony was introduced to the effect that the prospect of a floodway has practically destroyed the sale and loan value of the land within its limits. The same contention exists with reference to the Missouri floodway, but here the plan does contemplate purchase of flood easements—the question is only as to the value of such easements. This distinction made by the plan in reference to damages, rests on the fact that entrance to the Missouri floodway is to be several feet lower than the present levee crest, whereas that of the Boeuf floodway is planned at the same elevation as the existing levee. The net result of litigation on such questions as these will delay and probably very considerably increase the ultimate cost.

Economic Aspects.—Since the project is financed by Federal appropriation, it is probable that the only phase of general economic aspects that will come in for serious, critical consideration is that of taking certain lands or putting flood easements on them, in order to benefit other properties. This is a paramount issue in both the Missouri and Boeuf-Atchafalaya floodway cases. Despite the Attorney General's ruling that the plan is fixed and final, President Hoover has recommended postponement of construction on the Boeuf-Atchafalaya floodway for more thorough study. Special surveys are being rushed so that an alternative plan for a narrower, controlled floodway may have the consideration of Congress. Such postponement, however, is not provided for other features of the project.

CONSTRUCTION CONDITIONS

Building Levees.—The actual construction, while involving some new conditions and rather unusual features, presents no insurmountable difficulties. The enlarged levee section, together with the fact that much of the levee construction will be over or against existing levees where nearby borrow material has already been exhausted, will require much longer haul than has previously been the case. The recent transition from the use of brush, timber, and stone for bank protection, to concrete and steel, is another marked departure from former construction. Such new conditions are being promptly met by contractors through the development of new plants, equipment, and methods, and the large quantities and long construction period would seem to assure the fact that these construction problems will be effectively solved as the work progresses. The construction, as planned, can be carried out with economy and dispatch.

Engineering Problems.—In the case of the technical engineering problems and economic aspects of the project, the outlook is somewhat different. The calculation of flow in river channels is not a new problem with hydraulic engineers. Levee design has received much study, as have various methods of bank protection, spillway and floodway design. A prediction, however, as to what may be the greatest flood on a drainage area of a million and a quarter square miles, the design of a channel in alluvial soil to safely carry two to three million cubic feet of water per second, the diversion of a half million to a million cubic feet per second over earth dikes into floodways, and the calculation of flood heights to a nicety of two or three feet, are problems to tax the greatest engineering skill and the wisest of human judgment. To build a "fuse plug" entrance to a floodway is a simple matter,—just an earth dike a few feet lower than the adjacent river and floodway levees. To calculate accurately what will happen when a million cubic feet of water per second are permitted to flow over such a fuse plug is beyond our present experience. The destructive effect of such large volumes of flow directed through the floodways will doubtless be very great and it seems quite probable that after a flood or two the floodway areas will not be extensively farmed or lived in, but will rapidly revert to wilderness. The fertile soil and warm climate will quickly produce dense brush and thicket growth. To leave such growth would greatly reduce the capacity of the floodway; to clear it would be very costly. While the fuse plug and spillway plan offers relief in great floods by diverting the peak of the flow away from the main channel, this relief does not come until the flood approaches the tops of the levees and taxes these, as well as the bank revetment and other channel works, to the maximum stress. There still remains then, the danger of under-scour of levees, of caving banks at weak points, of sand boils and seepage, and of crevasse, all of which have been dangerous enemies to the existing flood protective works. In view of these conditions it does not seem reasonable to believe that the present plan will afford permanent and complete protection against the greatest floods, and it seems almost a foregone conclusion that such complete protection will eventually cost much more than the $325,000,000 which Congress has authorized.

The Mississippi as a Hydraulic Laboratory.—For some years past eminent hydraulic engineers in this country have urged the establishment of a national hydraulic laboratory where river hydraulic problems, such as relate to Mississippi flood control, can be studied in a practical and tangible way. Although several such laboratories already exist in Europe the project here has not been supported by Congress. It appears now that this country is to have a river hydraulic laboratory of vast proportions, and to natural scale, in the Mississippi flood control project itself, where the construction of actual works will prove or disprove the theories and basic assumptions which have determined the construction plans. It will provide valuable experience but may prove to be a most costly laboratory.

CONCLUSION

This discussion covers only the features included in the present plan. It is the writer's opinion that the entire problem of Mississippi flood control needs to be restudied, and that such study might very vitally change the general features of the plan.

XIX. ENGINEERING AND CONSTRUCTION

AMERICAN MACHINERY

By W. H. Rastall

Chief, Industrial Machinery Division, Bureau Foreign and Domestic Commerce

BUSINESS SITUATION

Prosperity of the Industry.—The year 1929 has undoubtedly been the most prosperous ever experienced by the American machinery industry, not excluding even the War and post-armistice years. This, of course, is a very strong statement because during this earlier boom the machinery industry was taxed to the utmost to meet the military and industrial requirements not only of the United States, but in a sense, of the entire world. There is little statistical material available to support this statement because the industry is probably less than ten per cent organized, and such figures are usually compiled by trade associations. Months will elapse before census figures are available, but statistics that are available and daily contact with the industry indicate that the operations in 1929 have been at a very high level. Not only has there been full employment but there has been a certain scarcity of skilled labor. Some firms have found it necessary to ask six months, nine months, or even longer in making deliveries.

Profit Experience. — The earning statements of twelve companies at the end of the third quarter show a 35 per cent increase over the corresponding figure for the previous year. In The American Year Book for 1928 figures were presented showing the profit experience of the machinery industry as based upon income tax returns, using figures published by the Treasury Department covering the reports of 1926. It is now possible to bring that statement down to date giving the results shown in 1927. (See Table.) It will be observed that although gross income increased over $500,000,000, net income decreased nearly $400,000,000, and the ratio of profit to gross income decreased one or two per cent in almost every class. Remembering the low rate of turnover in the machinery manufacturing industry it would appear that these figures deserve very careful consideration and suggests that even though this industry may have been unusually prosperous during the past year, various of its elements are still probably earning little more than bond rates of interest on their investments.

Metal Manufacture	Total No. of Returns 1927	No. of Companies Reporting No Net Income —1927—	Percentage of Companies Reporting No Net Income —1927—
Products of blast furnace, steel mills and rolling mills	3,066	1,083	35.48
Locomotives and railroad equipment	200	72	36.
Motor vehicles and accessories	1,167	595	50.98
Electrical machinery and equipment	1,168	471	40.32
Household machinery and equipment	1,000	427	42.70
Factory machinery, textile, paper, printing presses, machine tools, etc.	1,369	545	39.81
Building materials and supplies	1,505	678	45.04
Agricultural machinery and equipment	487	186	38.19
All other machinery, stationary, marine, gas, mining and oilwell, office machinery, etc.	3,207	1,327	41.37
Metals and metal products, other than iron and steel, refining of precious metals, manufacturing jewelry, etc.	947	365	38.54
All other manufactures, airplanes, optical products, musical instruments, metal processes, etc.	14,369	5,895	41.02
Total	28,485	11,644	40.87

UTILITY OF MACHINERY

Production.—A great deal of progress has been made during the past year in the technical importance of machinery. New designs of almost endless variety have been introduced, making it possible for manufacturers to reach even higher levels in mass production with corresponding economy and accuracy in production of materials.

Equipment and Methods.—Obviously, this has the effect of rendering older equipment obsolete, and industrial managers generally are developing a new line of thought regarding the normal life of factory equipment, programs for replacement, and proper adjustment of accounting methods as required to protect their assets in the face of the exceedingly rapid progress that is being made in manufacturing methods and equipment used therewith.

Cases have come to the writer's attention where machinery that would not depreciate in less than twenty years has been rendered useless through obsolescence in ninety days. In some instances this obsolescence is a very serious matter, because large investments are involved. The whole progress represents a new line of thinking in industry generally, and is one that will undoubtedly show many interesting developments hereafter.

MACHINERY EXPORT TRADE

Volume and Value.—Shipments of machinery from the United States in 1929 were approximately $260,000,000, if we refer exclusively to classes of machinery that are used in factories, mines, and on construction work, and would represent a much larger total if other types of machinery were included. For the first time in history the first nine months of the year showed machinery exports representing a larger total than any other commodity, such commodities as raw cotton, petroleum, copper and others that have previously been so important in our export trade have fallen behind machinery during this year. If allowance is made for the economic importance as contrasted with these raw materials, the significance of this trade is obviously much more significant. As contrasted with this figure of $260,000,000 for 1929 it was $206,000,000 in 1928, $184,000,000 in 1927, $112,000,000 in 1922. This represents a very substantial and satisfactory growth, the figure for the year probably only being exceeded by the shipments in 1919 and 1920, when abnormal conditions prevailed.

Foreign Markets.—These shipments go to every country in the world with the most important volume being absorbed by Latin America and Europe, and there is reason to believe that a much larger trade will develop

Total Gross Income (No Figures for 1924) —1926—	Total Gross Income 1927	Total Net Income Less Deficit 1926	Total Net Income Less Deficit 1927	Percentage of Profit Earned vs. Total Gross Income 1926	Percentage of Profit Earned vs. Total Gross Income 1927
$ 3,771,951,754	$ 4,779,316,593	$ 341,757,227	$ 210,857,378	.09 +	.04 +
651,904,281	454,619,292	51,543,240	32,434,392	.08 —	.07 +
5,291,130,721	4,642,567,692	442,293,343	320,520,662	.08 +	.07 —
1,442,163,566	1,235,110,517	144,184,869	108,771,086	.10 —	.09 —
738,733,608	634,856,938	77,340,214	60,719,134	.10 +	.10 —
834,621,468	660,219,563	85,701,662	59,545,141	.10 +	.09 +
836,569,630	830,300,092	71,064,157	50,761,938	.08 +	.06 +
553,924,211	592,690,560	53,235,085	71,491,337	.09 +	.12 +
2,611,058,519	1,902,186,216	228,424,783	141,355,018	.08 +	.07 +
1,721,817,330	400,357,656	115,325,172	17,730,145	.06 +	.04 +
2,526,635,147	5,281,992,104		291,284,480	.06 —	.06 —
$20,980,509,983	$21,414,217,223	$1,761,022,439	$1,365,470,711	.08 +	.08 +

as economic conditions improve in various foreign countries, Asia and certain European countries being especially depressed economically during recent months.

Washington Conference.—Interest in export business during the last weeks of the year was considerably increased as the result of the conferences called in Washington by President Hoover in connection with his efforts to protect the business of the country from depression following the collapse in the stock market that started Oct. 24. This has served to impress upon the minds of various business men the importance of export trade, not only as represented by its mere dollar value, but as providing a diversity factor that protects business during a crisis.

TRADE ASSOCIATION ACTIVITIES

During the latter part of the year there has also been renewed interest in organization in the machinery industry. Some new trade associations have been organized, some of the older ones have been strengthened and made more effective, and the conferences called by President Hoover have also served to emphasize the value of organization at such times, and the importance of having groups properly authorized to represent the industry as a whole.

COGNATE SOCIETIES

ALLIED BUILDING METAL INDUSTRIES, 10 W. 33rd St., N. Y. C.
AMERICAN CERAMIC SOCIETY, 2525 N. High St., Columbus, O.
AMERICAN CONCRETE INSTITUTE, 2970 W. Grand Blvd., Detroit, Mich.
AMERICAN CONSTRUCTION COUNCIL, 28 W. 44th St., N. Y. C.
AMERICAN ENGINEERING STANDARDS COMMITTEE, 29 W. 39th St., N. Y. C.
AMERICAN FOUNDRYMEN'S ASSN., 222 W. Adams St., Chicago, Ill.
AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, 85 Livingston St., Brooklyn, N. Y.
AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, 33 W. 39th St., New York City.
AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, 29 W. 39th St., N. Y. C.
AMERICAN INSTITUTE OF RADIO ENGINEERS, 37 W. 39th St., N. Y. C.
AMERICAN IRON AND STEEL INSTITUTE, 75 West St., N. Y. C.
AMERICAN RAILWAY ENGINEERING ASSN., 431 S. Dearborn St., Chicago, Ill.
AMERICAN ROAD BUILDERS ASSN., Press Bldg., Washington, D. C.
AMERICAN SOCIETY FOR STEEL TREATING, 4600 Prospect Ave., Cleveland, Ohio.
AMERICAN SOCIETY FOR TESTING MATERIALS, 1315 Spruce St., Philadelphia, Pa.
AMERICAN SOCIETY OF CIVIL ENGINEERS, 33 W. 39th St., New York City.
AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, 25 W. 39th St., N. Y. C.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS, 29 W. 39th St., New York City.
AMERICAN SOCIETY OF MUNICIPAL ENGINEERS,
AMERICAN SOCIETY OF NAVAL ENGINEERS, Navy Dept., Washington, D. C.
AMERICAN SOCIETY OF REFRIGERATING ENGINEERS, 37 W. 39th St., New York City.
AMERICAN SOCIETY OF SAFETY ENGINEERS, 25 W. 39th St., N. Y. C.
AMERICAN STATISTICAL ASSN., 114 Woodward Bldg., Washington, D. C.
AMERICAN WELDING SOCIETY, 29 W. 39th St., N. Y. C.
BUILDING TRADES EMPLOYERS' ASSN., 2 Park Ave., N. Y. C.
COMMITTEE ON EXPERIMENTAL POWER, 2 Rector St., N. Y. C.
ENGINEERING FOUNDATION, 29 W. 39th St., N. Y. C.
ILLUMINATING ENGINEERING SOCIETY, 29 W. 39th St., N. Y. C.
NATIONAL AERONAUTIC ASSN., 1623 H St., N. W., Washington, D. C.
NATIONAL BOARD OF FIRE UNDERWRITERS, 85 John Street, New York City.

National Electric Light Assn., 420 Lexington Ave., N. Y. C.

National Fire Protection Assn., Boston, Mass.

New York Electrical Society, 29 W. 39th St., N. Y. C.

Society for Promotion of Engineering Education, 29 W. 39th St., N. Y. C.

Society of Automotive Engineers, Inc., 29 W. 39th St., N. Y. C.

Society of Naval Architects and Marine Engineers, 29 W. 39th St., N. Y. C.

DIVISION XX

GEOPHYSICAL SCIENCES

DYNAMIC AND STRUCTURAL GEOLOGY

By Kirtley F. Mather

Professor, Harvard University

OBSERVATIONS AND DEDUCTIONS

Quantitative Date.—The strenuous effort to substitute quantitative studies for the qualitative examinations which marked the earlier decades of the history of geology have borne much fruit during the year. A color chart of sedimentary rocks has been prepared and published by a subcommittee of the National Research Council and as a result the statements concerning colors of rocks as observed in field or laboratory can now be placed on a scientific basis. Another subcommittee of the Research Council is making progress in its attempt to systematize and standardize the classification and nomenclature of sedimentary rocks.

Changes of Level.—Under the joint auspices of the National Research Council and the United States Coast and Geodetic Survey precise observations of sea-level have been completed in Jamaica Bay. These indicate among other things that there has been no appreciable change in sea-level along this portion of the Atlantic coast over a period of thirty-five years. Within Jamaica Bay, as elsewhere along the coast of North America, mean sea-level is appreciably distorted as a result of wind action, the shape of the sea floor and the form of tidal channels. Modification of shore features by erosion has from time to time changed the distortion of the sea surface and this has lead to the erroneous belief that at certain places the coast is rising or sinking.

Artesian Pressure.—An interesting discussion concerning the origin of the pressure responsible for the flow of artesian wells has appeared in several issues of *Economic Geology* during the year. In 1928 W. E. Russell (*Econ. Geol.*, vol. 23, pp. 132-157) presented a series of very striking arguments against the generally accepted ideas concerning the development of artesian pressure in such formations as the Dakota sandstone in the Great Plains region and proposed the theory that the artesian water was contained in a series of disconnected sandstone lenses which had been compacted as a result of compression. Charles Terzaghi (*Econ. Geol.*, vol. 24, pp. 94-99) is one of many critics of Mr. Russell's theory who supports the traditional view of artesian flow in consequence of hydrostatic pressure. The discussion throughout the year makes evident the complex nature of the problem and thus far has not reached any final conclusion.

GEOPHYSICAL INSTRUMENTS

Determination of Structure.—The use of seismic apparatus, the torsion balance and the gravity pendulum has been greatly extended during the year, especially in localities where valuable reservoirs of oil might possibly occur. In consequence, our knowledge of the subsurface structure at many places in Texas, California and elsewhere has been greatly extended. It is estimated that to date about 350,000 square miles have been covered by detailed torsion balance surveys in the United States and a still larger area has been subjected to examination with seismic instruments. Approximately forty salt domes have been discovered in the Gulf coastal region by these instruments.

The Gravity Pendulum at present is beginning to rival the torsion balance in its usefulness. Thus far the pendulum is primarily applied to the determination of relative depth of the crystalline basement in the mid-Continent oil fields and to the search for salt domes in the Gulf Coast.

REGIONAL STUDIES

Boston Basin.—Among the outstanding contributions of the year to a detailed knowledge of structural geology is that of Marland Billings ("Structural Geology of the Eastern Part of the Boston Basin," *Amer. Jour. of Sci.*, 5th series, vol. 18, pp. 97-137). He concludes that in the deformation of the sedimentary rocks of the Boston region the major pressure was from the south and developed shingle-block structure with anticlinal folds and numerous tear-faults.

Southern Oregon.—In recent years the origin of fault blocks and of horst and graben structure has been discussed considerably. Earlier students inclined to the view that such structures were a result of normal faulting and tensional stress, but more recently the idea has gained sway that they are due to compression. It is extremely difficult to interpret the structural features in the Great Basin, but in southern Oregon east of the Cascades a series of tertiary lavas is cut by the northern continuation of the Basin Range faults. R. E. Fuller and A. C. Waters (*Jour. Geol.*, vol. 37, pp. 204-238) have made a detailed study of that area and conclude that the tensional origin of the faults there is indicated in many ways.

BIBLIOGRAPHY

Among the outstanding books published during the year are the following: *Structure of Typical American Oil Fields*, by members of the American Association of Petroleum Geologists; *Geology from Original Sources*, by Agar, Flint and Longwell; *Geophysical Prospecting*, by members of the American Institute of Mining Engineers.

EARTHQUAKES AND VOLCANOES

BY KIRTLEY F. MATHER
PROFESSOR, HARVARD UNIVERSITY
AND
L. DON LEET
DOMINION OBSERVATORY, OTTAWA

GENERAL REVIEW

Quakes in Eastern States.—The Eastern States claimed a larger part than usual of the interest in earthquakes within the continental limits of the United States during the interval that has elapsed since the earthquake survey in THE AMERICAN YEAR BOOK for 1928. The well-marked quakes of November 2, 1928, in the Southern Appalachians, and of August 12, 1929, in New York State accounted for this. The latter involved property damage but neither caused loss of life.

Outside Continental U. S.—Among the possessions, Alaska, in the vicinity of Fairbanks, reported one of the severest quakes in its history, while Hawaii and the Philippine Islands experienced series of shocks. Outside the territorial limits of the country, seventeen workers lost their lives at the American-owned El Teniente copper mines, whose property losses also were included in the total of $12,000,000 damage done by a quake which destroyed the city of Talca, Chile, on December 1, 1928.

Volcano Activities.—The volcanoes of Mayon, in the Philippine Islands, and Kilauea in Hawaii participated in a world-wide renewal of volcanic activity during the year.

EARTHQUAKES

New England and New York.—On August 12, 1929, at 6:25 A.M. eastern standard time, an earthquake centering in western New York was felt in New York, Pennsylvania, Ohio, New Jersey, Connecticut, New Hampshire, Vermont, Michigan, Maine, and the province of Ontario, Canada, over an area of about 100,000 square miles. It was one of the most important of recent earthquakes in the eastern part of the country whose center was within the United States, according to a report by the United States Coast and Geodetic Survey, which has conducted a detailed field investigation. The earthquake of Feb. 28, 1925, was felt throughout the same region, and over a much larger area, but its center was in Canada. The area over which this earthquake was strong enough to cause damage was about 225 square miles. It is significant that it was recorded by more seismograph stations, eight in all, with high grade instruments, than any previous eastern earthquake. Constant efforts are being made to improve the recording facilities in the Eastern States and Canada to a point where many of the puzzling features surrounding such shocks can be better studied. The concentration of population in areas within their range of possible effectiveness renders such studies of definite economic value. Two other quakes in this region were reported in the press: one around Portland, Me., on Feb. 5, 1929; the other near Malone, N. Y., June 5, 1929. In addition to these, there has been an increase in the number of small tremors of mysterious origin recorded on the network of Canadian instruments about the St. Lawrence valley and on the more northerly instruments in the states.

On Nov. 18, 1929, the Maritime Provinces and New England and portions of the closely adjacent states were disturbed by a strong earthquake at 3:35 p.m. Buildings in and near Boston, and at many places in New Hampshire and along the coast of Maine, swayed perceptibly so that many persons were startled by the movement. A small amount of damage to buildings and contents was reported from Halifax and other localities in Nova Scotia and New Brunswick. The earthquake was recorded on all the seismographs in the Eastern States and Canada, and its epicentre was promptly located beneath the eastern part of the Gulf of St. Lawrence, a few score miles southwest from Newfoundland. The unusual severity of the quake was indicated by the large area throughout which it was perceptible to man, as well as by the fact that several Trans-Atlantic cables were broken by it. Two days later, reports were received from isolated localities on the southern coast of Newfoundland which indicated that a severe tidal wave caused by the quake had swept along that shore. The tidal wave caused much property damage and resulted in the death of approximately forty persons. This is the first earthquake north of Mexico in North America which has caused loss of life since the Santa Barbara earthquake in 1925. In intensity it is a close second to the St. Lawrence earthquake of February 28, 1925.

Southeastern Coast and Mississippi.—On the night of Nov. 2, 1928, at 11:03 P.M., eastern standard time, an earthquake shook about 40,000 square miles of territory in Tennessee, North Carolina, South Carolina, Georgia, Virginia, and Kentucky. Its origin was northwest of Asheville and close to the boundary between North Carolina and Tennessee. This is the heart of the southern Appalachians, which has been the scene of quite a number of shocks of similar type. The United States Coast and Geodetic Survey conducted an investigation of the quake, a report of which is published in the *Bulletin* of the Seismological Society of America (Volume 18, Number 4, Dec., 1928.) Other shocks reported from this region, all of very slight intensity, are: Cleveland, O., 3:00 P.M., Sept. 9 1928; Ocean City, Md., Oct. 16, 1928; Richmond, Va., 6:45 A.M., Oct. 30 1928; Asheville, N. C.; Johnson City Tenn. (an after shock of the Nov. 2 quake), 10:45 P.M., Nov. 19, 1928; Charlotte, N. C., Dec. 24, 1928

Princeton, Ind., Feb. 14, 1929; Bellefontaine, O.; and Western Ohio, March 8, 1929.

Western Interior.—The severest shocks in this region were experienced in several sections of the Northern Black Hills on the night of Nov. 16, 1928. No damage was reported. Deadwood, S. D., appeared to be the center of the disturbance. Slight quakes were also reported from Yuma, Ariz., 10:48 P.M., July 18, 1928; Helena, Mont., 11:45 A.M., July 24, 1928; Yuma, Ariz., 5:00 P.M., Oct. 29, 1928; Missoula and Great Falls, Mont., 8:10 P.M., Feb. 15, 1929; Helena, Mont., Feb. 16, 1929.

Pacific Coast.—Damage estimated at $34,000, confined to buildings whose susceptibility was greatly increased by construction weaknesses, was done by an earthquake at 8:46 A.M., July 8, 1929, which centered about 14 miles southeast of Los Angeles, and was reported to have been felt over an area of about 2,000 square miles. Lesser shocks were reported from Los Angeles and Southern California, 6:40 A.M., Sept. 5, 1928; Calexico, Calif., 8:00 A.M., Sept. 23, 1928; San Diego, Calif., 4:00 P.M., Oct. 2, 1928; Calexico, Calif., Oct. 29, 1928; Lompoc, Santa Barbara County, Calif., 9:00 P.M., Nov. 1, 1928; Redondo Beach, Calif., 5:37 A.M., Nov. 18, 1928; Los Angeles, 12:57 P.M., Nov. 27, 1928, and Dec. 31, 1928; El Centro, Calif., March 11, 1929; Stockton, Calif., 3:00 P.M., March 8, 1929; Santa Barbara, Calif., 11:40 A.M., July 3, 1929.

The Philippines.—Press despatches from Manila, Philippine Islands, reported a violent earthquake Dec. 19, 1928, which shook the greater part of Mindanao Island. Four deaths were reported, an undetermined number were injured, and damage estimated at $100,000 was done. The origin of the quake was estimated to have been in the Celebes Sea about 600 miles south of Manila. A tidal wave was caused by the quake. A moderately large after shock occurred on December 29, 1928. Minor shocks were reported also from Manila, Nov. 22, 1928, Jan. 16, 1929, and June 13, 1929.

Alaska.—Fairbanks, Alaska, reported one of the most severe earthquakes in its history at 12:50 A.M., Jan. 21, 1929. Fourteen distinct earth shocks were counted during the next four hours. Damage was slight. After shocks continued for several days.

Southern Interior.—El Paso, Texas, buildings were shaken on the night of Oct. 31, 1928, at 9:14, mountain time, by the first earthquake in that territory in over five years. The shock was felt at a number of places within a radius of thirty miles in the valley. No damage was reported, but the disturbance was sufficiently severe to alarm the populace.

Central America and West Indies.—The most important quakes reported from these regions were Mexico City, July 7, 1928; Oaxaca, Mexico, partly destroyed, at 12:24 P.M., Aug. 4, 1928 (after shocks continuing for several days); Havana, Cuba, 3:10 A.M., Aug. 17, 1928; Oaxaca, Mexico, felt in nine Mexican states, Oct. 9, 1928; Havana, Oct. 29, 1928, and Kingston, Jamaica, Nov. 4, 1928.

EARTHQUAKE RESEARCH

Committee on Field Data.—On January 31, 1929, under the National Research Council of Washington, D. C., there were appointed as a *Committee on Field Data of Earthquakes* nine geologists and seismologists under the chairmanship of Dr. Arthur Keith, Chairman of the Research Council's Division of Geology and Geography. The purpose of this committee is to collect data desirable in the study of earthquakes which cannot be obtained from instruments alone, or from the present widely-scattered stations. The efforts of the committee will for the present be specially directed to the important districts in the eastern half of the United States and Canada, since the Western part of the country, particularly the Pacific Coast seismic belt, has been under investigation by other agencies for a number of years.

Earthquake history of the United States, exclusive of the Pacific Region, has been compiled by the United States Coast and Geodetic Survey since seismological investigation was assigned to it by law in 1925. It is available for the price of 15 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., under the title, *Earthquake History of the United States, Exclusive of the Pacific Region*, By N. H. Heck. Department of Commerce, U. S. Coast and Geodetic Survey (Special Publication Number 149, 1928).

VOLCANOES

Mayon, the active volcano on Albay Province, Philippine Islands, became violently eruptive on July 10, 1928, and again on July 28th, driving the inhabitants of the surrounding countryside from their homes. This was followed by a series of reports of outbursts in other of the world's volcanoes. Timor, in Java, and Mt. Vesuvius went into action on the same day, August 7, 1928; Mt. Etna on November 2, 1928, and Krakatoa on November 5th, with 112 explosions.

The Hawaiian Islands experienced a sharp earthquake on February 5, 1929, and fifteen days later Kilauea erupted. This was followed by activity in still others: Santa Maria Volcano, Guatemala, on February 21, 1929; signs of activity in Grafenau, Bavaria, on February 23, 1929; an outburst from Kverkfjoll, Iceland, on March 7, 1929; and a renewal of activity in Mayon, April 2, 1929. On May 29, 1929, Buenos Aires, Argentine, received reports of activity in a newly-discovered volcano near Cruz de Piedra Canyon in the Department of Carlos. The month of July witnessed activity on the Island of Ambrym, Fiji Group, on the third; Komagatake, Yezo, Japan, on the nineteenth; and another eruption from Kilauea on the twenty-fifth.

ECONOMIC GEOLOGY

By W. Elmer Ekblaw

Assistant Editor, *Economic Geography*, Clark University

RESEARCH

Problems and Trends.—The year has been characterized by a distinct increase in interest in the study of ore deposition and considerable progress in unraveling some of the knotty tangles in theory and practice of mineral exploration and development; by definite action toward the control of petroleum production; by evident trend toward stabilization of the coal industry; and by sustained production and use of road-building materials and minerals for construction purposes. The departments of geology in a number of the larger educational institutions of the country are coöperating to a greater extent than ever before with the state and national surveys in problems of both theoretical and applied geology, and private organizations, particularly the larger and better organized mining and oil corporations, are emphasizing their research activities to an unprecedented and exhaustive degree.

Rock Analyses.—Trustworthy rock and mineral analyses have long been recognized as the necessary bases of geological science, and since the well equipped and technically manned laboratories of the United States Geological Survey and the Carnegie Institution have been fully occupied with the research of their own staffs, no means have been available to the general workers in the science for the dependable analyses which they must have as authentic bases for their investigations and deductions. As a consequence of this lack and need, the University of Minnesota, aided financially by an appropriation from th National Research Council, has established a research laboratory for th making of rock analyses. Professo Frank F. Grout, of the University o Minnesota, with years of careful training and wide experience to qualif him, will direct the work of the laboratory, while Dr. R. E. Ellestad, research assistant at Harvard and in structor at Tufts, will be in charge of the analyses. This laboratory will be fully equipped and manned to make prompt, careful, and trustworthy analyses for the petrologists of the whole country. It constitutes probably the most distinct advance in petrologic research of the century thus far.

Research and Equipment.—Refinement of technique comes only with refinement of instruments. The chief optical companies of this country and abroad are presenting distinct improvements in microscopes, theodolites, torsion balances, and other instruments of accuracy and precision, by which geologists, petrologists, and chemists as well as the miners and drillers themselves are enabled to advance their researches.

Federal and State Surveys.—The United States Geological Survey and the Bureau of Mines have extended their programs of research and application of scientific principles to discovery, development, and utilization of mineral resources. More generous appropriations from Congress for both these agencies is urgently demanded, if their service is to keep pace with the growth of industry and its need for technical advice. The needs of industry are so great and so insistent that the relatively small personnel and limited equipment of both organizations is inadequate to supply in adequate measure the immediate help requested, and at the same time reserve time and opportunity for pure research and original investigation. The state surveys and university departments, as well as a number of private concerns, are striving valiantly to help supply the need, but they, too, are suffering the limitations of insufficient funds and small personnel. If the United States is to maintain a ranking position in economic geology among the other industrial nations, these scientific bodies must be more liberally supported.

MINERALS

In ever increasing demand the minerals of the world are finding growing importance in the trade and industries of the world. The spread of European-American civilization over all the lands of the world with the use of machinery and universal exchange of products as its most conspicuous and distinctive phenomena necessitates the use of incredible quantities of iron and steel in agricultural implements, rolling stock, rails, ships, and structural framework; of vast quantities of copper in telegraph and telephone cables and electrical apparatus; of lead and zinc and nickel and tin, either pure or as alloys in the arts; of lime for cement and clay for brick, and stone for macadams; of coal for fuel and power; of petroleum for power and lubrication; of phosphates and potash and nitrates for fertilizer; of all the lesser minerals for a thousand and one uses. As the frontiers of civilization are pushed farther and farther from Europe and America, the need for minerals takes on greater and greater importance. The prominent part that the great reserves of coal, iron, petroleum, and other minerals plays in making America and Europe dominant in world economy and world politics is being ever more clearly recognized.

PERIODICAL PUBLICATIONS

Economic Geology has published during the year a splendid series of articles, of which none are exceptional or revolutionary but all displaying soundness of research: "Structural Control of Ore Deposition" by Carlton D. Hulin; "Solvent Effects of Certain Organic Acids upon Oxides of Iron" by Norman J. Harrar; "Zoning in Michigan Copper Deposits and Its Significance: Part I" by T. M. Broderick; "Contact Metamorphism of the Ellsworth Schist near Blue Hill, Maine" by J. L. Gillson and R. M. Williams; "The Chromite-Bearing Ultrabasic Deposits of Singhbhum, India" by C. Mahadevan; "The Origin of the Deposits of Sulphide Ores of the Mississippi Valley" by W. H. Emmons; "Marcasite in Contact-Metamorphic Ore, Twin Buttes District, Arizona" by B. N. Webber; "Zoning in Michigan Copper Deposits and Its Significance: Part II" by T. M. Broderick; "The Problem of Supergene Cassiterite in Bolivian Tin Veins" by J. T. Singewald, Jr.; "A Study of the Magnetite Orebody at Cornwall, Pennsylvania" by W. H. Callahan and W. H. Newhouse; "The Determination of Anisotropism in Metallic Minerals" by Edward Sampson; "Some Covellite-Chalcocite Relationships" by Alan M. Bateman; "The Sherritt Gordon Copper-Zinc Deposit, Northern Manitoba" by E. L. Bruce; "New Occurrences of Germanium. II. The Occurrence of Germanium in Silicate Minerals" by Jacob Papish; "Solution, Transportation, and Precipitation of Iron and Silica. Part III.' by E. S. Moore and J. E. Maynard; "Agawa Iron Formation of Northeastern Minnesota" by J. T. Stark; "Greisen and Associated Mineralization at Silver Mine, Missouri" by J. T. Singewald, Jr., and Charles Milton; "The Growth of Magnetite Crystals" by G. M. Schwartz; "The Significance of 'Unsupported Inclusions' " by S. B. Talmage; "A Diopside-Bearing Pegmatite in Dolomite" by E. H. Watson; "Origin of the Wabana Iron Ore of Newfoundland" by Albert O. Hayes; "Origin of Chromite Deposits" by L. W. Fisher; "A Diabase Contact-Metamorphic Mineral Deposit in Ontario" by F. F. Osborne; "Cellular Structure in Limonite" by P. F. Boswell and Roland Blanchard; and "Solubility, Hydrolysis, and Oxidation of Iron and Copper Sulphates" by Fred Foreman.

The Journal of Geology, devoted to the whole broad subject of geology, includes the following articles on petrology, of interest to economic geologists: "Mount Monadnock, Vermont—A Syenite Hill" by John E. Wolff; "The Stock of Alkaline Rocks Near Libby, Montana" by Esper S. Larsen and J. T. Pardee; "A Composite Stock at Snowbank Lake in Northeastern Minnesota" by C. W. Sanders, Jr.; "A Comparative Study of Different Types of Thermal Stratification in Lakes and Their Influence on the Formation of Marl" by E. M. Kindle; "The Mode of Origin of a Reaction Porphyry Dike at Cornucopia, Oregon" by G. E. Goodspeed; "Altered Tuffs in the Ordovician of Minnesota" by Victor T. Allen; "The Relation of Chemical Composition to Texture of Groundmass in Siliceous Lavas" by Howard A. Powers; "The Indices of Refraction of the Plagio-Clase Feldspars" by Harold L. Alling; "New Areas of Alkaline Igneous Rocks in Central Arkansas" by Carey Croneis and Marland Billings; "The Saganaga Granite of Minnesota-Ontario" by Frank F. Grout; "The Structures and Batholiths of French River Area" by Terrence Quirke; and "The Orthoclase-Plagioclase Equilibrium Diagram" by Ruth Allen Doggett. In addition there are other articles of interest to economic geologists: "The Nature and Origin of the Horst and Graben Structure of Southern Oregon" by Richard E. Fuller and Aaron Clement Waters; "Valley Deposits Immediately East of the Channeled Scabland of Washington. I" by J. Harlen Bretz; "The Latah Formation in Idaho" by Virgil R. D. Kirkham and M. Melville Johnson; "The Age and Nomenclature of the Rome ("Watauga") Formation of the Appalachian Valley" by Herbert P. Woodward; "The Anomalous Stratigraphy of Deadman's Island, California" by C. H. Crickmay; "Stratigraphy of the Decorah Formation" by G. Marshall Kay; and "Possible Desert-Basin Integration in Utah" by James Gilluly.

BOOKS

Petrogenesis.—Many books of noteworthy significance dealing with economic geology have appeared this year. Among them *The Evolution of the Igneous Rocks* by N. L. Bowen takes first rank as a scholarly volume dealing with petrogenesis. Bowen's thesis makes all igneous rocks originate from a basaltic magma having its source in selective fusion on release of pressure of peridotite and movement of the liquid part, and the variations in composition result primarily from crystallization and separation of liquid from crystals, and secondarily by the settling of crystals into a liquid.

Oil and Gas.—*Function of Natural Gas in the Production of Oil* by H. C. Miller is another book of major economic interest. It is a report of the United States Bureau of Mines in cooperation with the Division of Development and Production Engineering of the American Petroleum Institute.

Of superlative value to all petroleum geologists particularly, *Structure of Typical American Oil Fields. A Symposium on the Relation of Oil Accumulation to Structure*, of which Vol. I. has appeared, promises to constitute one of the most important publications in the profession. It is issued by the American Association of Petroleum Geologists, an organization which has placed "oil geology" in an enviable position of dignity and respect among all sciences and professions.

Copper.—An exhaustive study on *The Copper Deposits of Michigan* appears as Professional Paper 144 of the United States Geological Survey, by B. S. Butler and W. S. Burbank, in collaboration with T. M. Broderick, L. C. Graton, C. D. Hohl, Charles Palache, M. J. Scholz, Alfred Wandke, and R. C. Wells.

Water Power and Irrigation.—Kirk Bryan summarizes excellently the principles and methods employed in the important field which he has made part of his own research domain, in Geology of Reservoir and Dam Sites, with a Report on the Owyhee Irrigation Project, Oregon, issued as Water Supply Paper No. 597a, United States Geological Survey.

MINERALOGY AND PETROGRAPHY

By Herbert P. Whitlock

American Museum of Natural History

MINERALOGY

Mineralogical Society Meeting.—The annual meeting of the Mineralogical Society of America which was held in December of 1928 in New York City may be said to have begun the year 1929 with several outstanding contributions to the science of Mineralogy. The address of the retiring President of the Society, Dr. Esper S. Larsen, dealt with the "Temperatures of Magmas" and was replete with matter both constructive and suggestive in this highly important field. A Committee appointed in 1925 to consider the preservation of type mineralogical material, with special reference to material from which new species have been determined reported that, while unable to select any single institution as a repository for such original material, the Committee recommended that mineralogical research workers residing in the United States be urged to deposit their type material in the U. S. National Museum at Washington.

Outstanding papers which were read at this meeting were two by Prof. Charles Palache, of Harvard University, the first, on a Paragenetic Classification of the Minerals of Franklin, New Jersey, in which he listed and discussed the 137 mineral species of this most interesting locality; and the second, a Comparison of the Ore Deposits of Langban, Sweden, with those of Franklin, N. J. Taken together these two papers may be said to represent the high spot in a series of most valuable contributions brought out by this meeting. Among other papers of general interest, a valuable contribution to the determinative methods of optical mineralogy is contained in the series of tables listing the dispersion of Minerals, compiled by Prof. A. N. Winchell, of the University of Wisconsin.

NEW MINERALS

Julienite and Renardite.—The new mineral species announced during the year 1929 rank well in importance and interest with those of previous years. From the Katanga region of the Belgian Congo come two new species. *Julienite*, a hydrous cobalt nitrate related to the buttgenbachite, recently reported from the same locality (The American Year Book, 1926) occurs in thin crusts of fine blue needle-like crystals. *Renardite*, another in the group of lead uranium phosphates from Katanga, is yellow in color. Julienite was named in honor of Henri Julien, and Renardite, in honor of A. F. Renard, formerly a Professor of Mineralogy at the University of Gand, Holland.

Gudmondite and Hæmatophanite.—Two new mineral species have been found in Sweden. A new iron sulphantimonide of the marcasite group, occurring in silver white to steel gray orthorhombic crystals, has been named *Gudmondite*, from the locality Gudmundstorp, 3 kilometers north of Sala, Sweden. *Hæmatophanite* is a new lead ferrate with lead chloride found in dark reddish brown plates at Jacobsberg, Sweden.

Mitscherlichite.—The crater of Vesuvius, always a prolific source of new and rare mineral species, has furnished from the material collected in 1920 and now for the first time investigated, a new hydrous chloride of potassium and copper. This mineral which occurs in minute greenish blue crystals has been named *Mitscherlichite* in honor of E. Mitscherlich, who prepared an artificial salt of this composition in 1840.

Larnite.—A rock forming calcium orthosilicate of distinctly unique optical properties has been noted among other rare species in the contact zone between chalk and dolerite near Larne, County Antrim, Ireland. The name *larnite* has been given to this mineral which occurs in grayish crystalline masses.

Tanteuxenite.—A new titanotantalate of yttrium from the Pilbara gold field in the Northwest Division of West Australia, has been named *tanteuxenite* because it is essentially an *euxenite* in which tantalum replaces columbium. The mineral occurs as indistinct crystals and crystalline masses brownish-black in color with a resinous luster.

Thucholite.—A new carbon mineral containing thorium and uranium was found on Parry Sound, Ontario, Canada, and has been named *thucholite.* It occurs in jet black non-crystalline nodules.

Zirklerite.—A new oxychloride of complex composition found in some of the salt stocks of North Germany has been named *Zirklerite* in honor of Dr. Zirkler, General Director of the Aschersleben Potash Works.

Mooreite.—Two new mineral species have appeared during the year as products of the mine of the New Jersey Zinc Company at Franklin, N. J. Of these *mooreite,* named in honor of the late Dr. Gideon E. Moore, a chemist and local investigator of Franklin minerals, is a very basic, hydrous sulphate of magnesium, manganese and zinc. Mooreite occurs in white monoclinic crystals of tabular habit.

Loseyite, another new Franklin mineral is named in honor of the late Samuel R. Losey, a local mineral collector. It is a basic carbonate of manganese and zinc, occurring in bluish-white lath-shaped monoclinic crystals.

Cooperite.—The tentative name *cooperite* has been proposed for a mineral occurrence that is claimed to be a new sulph-arsenide of the rare metal platinum, which is distinct from sperrylite the only native compound of platinum with another element hitherto known. The new platinum compound occurs very sparcely n steel-gray, metallic irregular grains and fragments in the Rustenburg District of the Transvaal.

PETROGRAPHY

Reviewing the general trend of literature published on petrographical subjects during 1929 there is evidenced a marked interest in the origin of pegmatites and in problems dealing with the optics and twinning laws of the feldspars. A series of important papers dealing with the intrusive dikes of northern England have appeared in the *Mineralogical Magazine* under the joint authorship of Prof. Arthur Holmes and Dr. H. F. Harwood, supplemented by a contribution in the same journal by Prof. S. I. Tomkeieff on the petrology of the Whin Sill intrusive sheet.

METEOROLOGY AND CLIMATOLOGY

By Burton M. Varney
Associate Professor, University of California

AEROLOGY

Weather Service Extension.—Extension of airways weather service noted as an outstanding contribution by the U. S. Weather Bureau to aeronautics during 1928, went forward handsomely during 1929. Hourly weather reports from stations averaging only 60 miles apart along the New York to San Francisco and Los Angeles airways, 3-hourly reports from about 60 stations 100 to 200 miles on either side of the airways, broadcasts of weather information by voice from Department of Commerce radio stations some 200 miles apart along the airways, are a few of the important developments. The immense significance of such a service, not only to air transport but to many other lines of business, need not be emphasized. An important feature of the Weather Bureau's contribution to safety in flying is the issuing of very short-range weather forecasts to advise the pilot of probable changes in conditions within the next hour or so, this very detailed forecasting being necessary because of the rapidity with which the changes frequently take place.

Observation Technique.—Advances in the technique of the Weather Bureau's aerological observations by means of balloons included the inauguration of "ceiling-balloon" flights for determining at airports the "ceiling" or altitude of the base of a continuous cloud cover through which it may be necessary for airplanes to ascend or descend, pilots in the air being advised by radio. The ceiling is determined by noting the time interval between release of a balloon and its disappearance into the cloud, the rate of ascent of the balloon being known. A second great advance for aerology in this country concerns the securing of observations on temperature, pressure and humidity at various heights in the free air during calm weather. Hitherto, the use of kites for supporting the meteorographs has of course resulted in gaps in the record during calms or very light winds. During the past year, balloons attached to music wire (0.010 and 0.012 inch in diameter) have been used for carrying the lighter "balloon meteorographs," this equipment making possible the attainment of heights of about 7000 feet. For winds of velocity too strong for these captive balloons but too weak for kites, the "limit-height balloon" (a free balloon) is used. With this type, the maximum altitude is predetermined by the length of a fuse, of known burning-rate, which upon burning out opens a valve to release gas from the balloon.

Greenland Expedition.—Aerological observations by the University of Michigan Greenland Expedition were brought to a close July 21 with the last pilot-balloon "run," the 870th run of a remarkable series during two whole years of such observations on Mt. Evans in southwest Greenland. Together with supplementary summer runs at a nearby station, these will form the basis of reports upon the first series of upper-air observations ever taken near the margin of the great inland ice.

Sounding Balloon Observations.—Continuing its coöperation in aerology with other national weather services, the Weather Bureau in December conducted the series of daily sounding-balloon observations incident to the "International Month" for 1929. On special days, selected by the forecaster at Washington, balloons released at frequent intervals obtained records from several stations simultaneously.

AMERICAN METEOROLOGICAL SOCIETY

Annual Meeting.—The annual meeting in December 1928 was held in New York, with a program of 20 papers (see *Bulletin* of the A.M.S., and the *Monthly Weather Review*, for many of these papers in full). Four of these dealt with the meteorological aspects of aviation, four with the rainfall of New England. Other papers dealt with unstable climatic boundaries; small balloons for instruction in meteorology; effects of northerly winds on Gulf Stream temperatures in the Straits of Florida; world maps for meteorologists; the forecasting of relative humidity for fire-weather warnings; meteorological hazards to aviation; photographs of cloud types over Greenland. An outstanding event of the session was President Humphreys' address (*Bulletin*, A.M.S. for March, 1929) on "Meteorology's Frozen Assets," an eloquent appeal for still more active use of available materials for meteorological research. Among the topics emphasized were "the preservation of Wilson A. Bentley's unique collection of microphotographs of snowflakes, the publication of C. Fitzhugh Talman's monumental dictionary of meteorological terms, the vast store of observational materials for both land and sea, the need for preparation of a comprehensive summary of mathematical meteorology." Use of research facilities is going forward as fast as very limited funds permit, but only adequate financing can release the stored-up materials for rapid progress in scientific meteorology in this country.

Washington Meeting.—At the April meeting in Washington, D. C., a group of three papers treated of various aspects of solar influence: Dr. Dinsmore Alter presenting "A Critical Test of the Planetary Tidal Hypothesis of Sunspots"; Professor C. F. Marvin "An Analysis of Fritz Sunspot Epochs"; Professor H. H. Kimball, "Solar Radiant Energy." Professor C. F. Brooks, with Miss H. V. Miller, reported upon progress of investigation of ocean water temperatures. The object of the study is to determine the extent to which the Gulf Stream delivers heat and moisture to the overlying air and hence becomes one of the influences over the climates of regions upon which this air blows. The fundamental problem is to secure accurate water temperatures. For this purpose, a "sea-water thermograph" has been installed on the *Henry M. Flagler* of the P. & O. Steamship Co., operating daily between Key West and Havana. This instrument automatically records the temperature of the sea water at the intake to the condenser. Supplementing its records are voluminous reports of water temperatures from vessels in the Caribbean Sea, which, for 1928 at least, show departures above and below the normal temperatures in almost exact coincidence with those of the Gulf Stream. This would suggest that water temperatures from the Caribbean may be used to extend the use of records some years back. These show temperatures obtained by sampling the surface water with a bucket, and they have sometimes indicated larger and more rapid changes than one might expect. But, the thermograph records are showing fluctuations of the same order. Hence it is believed that, barring a small but determinable observational error, the "bucket" records form a true basis for scientific deductions as to the effect of ocean water temperatures upon weather abnormalities.

Annual Western Meeting.—Western members of the American Meteorological Society held their annual meeting with the A.A.A.S. at Berkeley, Calif., in June. The contributions covered a wide range of subjects in both theoretical and applied meteorology. Thus, Mr. A. F. Gorton of the Scripps Institution of Oceanography reported upon the progress of his investigations into certain indices of California seasonal rainfall, finding evidence of recurrences in rainfall (and temperature) in periods which generally approximate multiples of the simple solar period. Major E. H. Bowie analyzed the influence of the great contrasts between cold, humid air over the Pacific Ocean and the hot, "dry" air over the Pacific Coast States, in causing certain cyclonic storms of summer over the Western States. As a contribution to the difficult subject of evaporation with respect to its influence upon loss of moisture from potential sources of water supply (lakes, rivers, snow)

E. E. Eklund presented a map and list of all known series of evaporation measurements in California. Papers on applied meteorology dealt with many important subjects, among them the Guggenheim Experimental Airway Service between Los Angeles and San Francisco; the use, tried in 1929 for the first time, of a motor truck equipped with meteorological apparatus and radio, at points near forest fires for issuing local weather forecasts as an aid in the fire fighting; the meteorological needs of a Class A1A airport; the growth of weather-reporting from ships at sea. (See *Bulletin* of the A.M.S. and the Monthly Weather Review, for reports upon these and many other subjects discussed at this meeting).

METEOROLOGY IN THE AMERICAN GEOPHYSICAL UNION

The Section of Meteorology of the Union at its April meeting received reports of satisfactory advancement in the preparation of a bulletin on meteorology, one of the Union's series of bulletins on the *Physics of the Earth.* Of special importance in connection with the program of research upon interrelations between sea and atmosphere noted above, was the publication in 1929 of *Bulletin* No. 68 of the National Research Council, dealing with a symposium upon that subject held by the Section of Meteorology of the Union in 1928.

RESEARCH

Ice On Airplanes.—Among the outstanding meteorological researches (in addition to those noted above) which were in progress or reached publication in 1929 was a study of atmospheric conditions when ice forms on airplanes, the U. S. Weather Bureau obtaining the coöperation of the National Air Transport, Inc., in equipping mail planes with Friez aero-meteorographs. Much valuable information respectnig the depth of fog, clouds, etc., and concerning the problem of weather forecasting for airways will result from this study.

Rain Forecasting.—An investigation which appears to be leading to extremely important results is Dr. Dinsmore Alter's upon the periodogram method for long-range forecasting of rainfall. His trial prediction for 1929 indicated a severe drought over England during the first half of 1929, and down to April 1 less than 50 per cent of normal precipitation to that date had occurred (the drought continuing) at the stations used in arriving at the forecast. Success hitherto attained in this work led to Dr. Alter's proceeding to England for further investigation of the matter under a Guggenheim Foundation Fellowship.

Optical Meteorology.—A notable contribution to optical meteorology was Dr. Edgar W. Woolard's treatise "On the Geometrical Theory of Halos," a work upon which the author has been engaged for some years. For a somewhat altered form of this treatise, a series of articles in the *Journal of the Washington Academy of Sciences* should be consulted.

Fog and Haze.—Following a year's study at the headquarters of various European weather services, Dr. C. Hurd Willett summarized his study of "Fog and Haze; their classification, causes and forecasting," in a thesis which will long remain the standard and the most authoritative work in this country on the subject.

Ocean Water Temperatures.—Dr. George F. McEwen, reporting in the *Bulletin* of the A. M. S. upon his continuing investigation of ocean water temperatures stated that "further study is being given to the oceanic and atmospheric factors and new sources of data are being made available. There is evidence that marine conditions have a bearing on the *trend* of rainfall over a period of years as well as on the precipitation of *individual* seasons."

Corn Ripening.—Researches by the United States Department of Agriculture into meteorological influences upon the ripening of corn, found that the plants may be injured by low temperatures above freezing. Some strains suffer serious deterioration of grain quality from a few nights of temperature down to 45° F., or even down to 50°. Some are actually killed by a few hours' exposure to temperatures of about 40°. The investigation has an important bearing upon the problem of selecting cold-resistant corn for planting in regions where such temperatures are found to occur with some frequency during the ripening season.

Precipitation Intensity.—A new method of analyzing hourly frequencies and intensities of precipitation was developed by W. F. McDonald of the New Orleans station of the Weather Bureau (*Monthly Weather Review*, Jan., 1929). To facilitate the study of frequencies through horizontal groups (for which purpose numerical tables are inadequate), plotting was done upon a logarithmic scale of frequency along the horizontal axis. The advantages revealed were: the feasibility of plotting clearly numbers ranging from 2 to nearly 3000; the placing in a straight-line relation of a series of precipitation values that vary by a fixed ratio; and, consequently, the discovery of a systematic internal structure in the group of values which leads to the inference that the events under analysis are themselves interrelated as a geometrical progression.

Tropical cyclones in a region of the ocean described by the U. S. Coast Pilot as "perhaps more treacherous than any other" were studied by W. E. Hurd of the Weather Bureau (*Monthly Weather Review*, February, 1929) on the basis of ship reports to the Bureau. These indicate a frequency of cyclones for the eastern Pacific Ocean off the coast of Mexico hitherto unrealized. At least 95 revolving storms occurred in the period 1910 to 1928 inclusive, and 34 per cent of these are known to have been of full storm to hurricane violence. The terrible central area of the individual cyclone appears to be here much smaller than in most tropical storms of other regions, though occasionally "a cyclone of huge proportions is met with."

TERRESTRIAL MAGNETISM

BY DANIEL L. HAZARD

UNITED STATES COAST AND GEODETIC SURVEY

MAGNETIC SURVEYS

Carnegie Pacific Cruise.—The yacht *Carnegie* of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington has continued without interruption the cruise begun in May, 1928, and has carried out successfully a full program of observations of terrestrial magnetism and electricity, as well as varied oceanographic work, meteorological observations and radio investigations. In August a photographically recording conductivity apparatus and a Meinesz gravity apparatus were installed on the *Carnegie* and the determination of gravity at sea has been added to the regular program. The year's cruise has been in the Pacific Ocean, with stops at Easter Island, Callao, Papeete, Apia, Guam, Yokohama, San Francisco, Honolulu and Apia a second time. The cruise has been arranged to provide numerous crossing of the earlier cruise of the *Carnegie* and the *Galilee*, in order to determine the change in the earth's magnetism in the interval. Instrumental comparisons were made at the magnetic observatories at Huancayo, Apia, Kakioka and Honolulu. At San Francisco, in August, appropriate exercises were held on the *Carnegie* to celebrate the 25th anniversary of the establishment of the Department of Terrestrial Magnetism.

Land observations of the Department were confined to coöperative work in the southern part of Africa. Assistance was given also to the Byrd Antarctic Expedition in the form of loan of magnetic instruments and training of observers.

Magnetic field work of the United States Coast and Geodetic Survey has been devoted primarily to the reoccupation of selected stations in the eastern and central parts of the country to determine the secular change of the earth's magnetism. Observations were made also in southern Alaska, the Philippine Islands and Hawaii. The Topographical Survey of Canada continued its magnetic work, particularly in the newly settled portions of the country. Observations were made along the Mackenzie river to the Arctic Ocean and in Hudson and James Bays. More than 1000 stations were occupied for declination, a few for dip and intensity and many for repeat observations. Many meridian lines were established. In some cases an airplane was used for transporting observers and instruments.

MAGNETIC OBSERVATORIES

Continuous photographic records of the variations of the earth's magnetism have been secured at observatories maintained by the United States Coast and Geodetic Survey at San Juan, P. R.; Cheltenham, Md.; Tucson, Ariz.; Sitka, Alaska; Honolulu, Hawaii; by Canada at Agincourt, near Toronto and at Meanook, Alberta; by Mexico at Teoloyucan, near Mexico City; by the Department of Terrestrial Magnetism of the Carnegie Institution of Washington at Watheroo, West Australia, and at Huancayo, Peru. That Department also coöperated with New Zealand in the maintenance of the magnetic observatory at Apia, Samoa. It coöperated with the Coast and Geodetic Survey in the erection and equipment of a building for atmospheric electricity observations at the Tucson observatory, and this important work is now in progress there under very favorable conditions.

INVESTIGATIONS

Radio Transmission.—There has been continued activity in the study of radio transmission and the varying electrical conditions in the upper atmosphere, which are implied by the variations in radio reception, and of possible correlations with solar and terrestrial magnetism and other phenomena. Among those taking an active part in this work are G. W. Pickard, Bureau of Standards, Naval Research Laboratory, General Electric Company, Harvard Astronomical Laboratory. E. O. Hulburt of the Naval Research Laboratory has developed a theory of the ionization of the upper atmosphere by ultra-violet light from the sun, which appears to fit the observed conditions of radio transmission and at the same time account for the portion of the earth's magnetism ascribed by Bauer's analysis to a cause outside the earth. He has also traced a correlation between magnetic storms and the zodiacal light.

Earth's Magnetism Studies.—Ross Gunn of the same laboratory has extended his diamagnetic theory of undisturbed terrestrial magnetic variations to provide a possible explanation of the origin and maintenance of the earth's magnetism. The Department of Terrestrial Magnetism has made an extended study of compass and dip circle deviations caused by harmonic motion (such as the rolling of a ship) in an effort to explain some discrepancies in the observations on board the *Carnegie.* The United States Coast and Geodetic Survey has made a new discussion of the secular change of the earth's magnetism in the United States, and on this has been based the reduction of the accumulated results of its magnetic observations to the year 1925 and the construction of isomagnetic maps for that year. The annual meeting of the Section of Terrestrial Magnetism and Electricity of the American Geophysical Union was devoted to a presentation of various theories of the magnetic and electric phenomena of the earth.

INSTRUMENTS

The Department of Terrestrial Magnetism has developed a photographically recording conductivity apparatus, which has been installed on the *Carnegie* and appears to be operating very satisfactorily. The Coast and Geodetic Survey has made a number of improvements in the recording instruments for magnetic observatories, tending to greater stability and accuracy and simplification of computations. Reports have been received of the successful use in the field in Russia, England and Japan of electrical magnetometers with which it is claimed that the horizontal intensity can be determined in less time and with greater accuracy than with the ordinary magnetometer.

PLANS FOR FUTURE WORK

Graf Zeppelin Cruise.—Arrangements are nearly completed for the cruise of the *Graf Zeppelin* in the spring of 1930 under the auspices of the Society for the Exploration of the Arctic by Airship. The cruise will extend from Norway to Fairbanks, Alaska, then a loop to the North Pole and back to Fairbanks, and then home to Germany. Observations of terrestrial magnetism and atmospheric electricity will be important features of the program of scientific work to be done on the cruise.

Auroral Observations.—A grant by the Rockefeller Foundation has assured the establishment at the Alaska Agricultural College and School of Mines at Fairbanks of a station for systematic observations of the aurora, photographic as well as visual, supplementing the work being carried on by Störmer and others in Norway. Visual auroral observations have been made at the magnetic observatory at Sitka, Alaska, for several years, but observing conditions there are very poor because of the small percentage of clear nights.

International Polar Year.—The need of extending our knowledge of the earth's magnetism into the Polar regions is fully recognized by magneticians, and at the meeting of the International Commission for Terrestrial Magnetism and Atmospheric Electricity held at Copenhagen last summer, action was taken favoring an International Polar Year in 1932-33, fifty years after the one of 1882-83, when different nations joined in making continuous observations at a ring of stations in the Arctic.

ECONOMIC GEOGRAPHY

By W. Elmer Ekblaw

Assistant Editor, *Economic Geography*, Clark University

GENERAL

The trend in geography continues toward a closer application of the principles which control the adjustment of man's activities,—his quest for food, shelter, raiment, culture and entertainment—to his environment. The regional aspect of ecomonic geography is being increasingly emphasized as the elements of any environment are studied. Since geography is centered about place as history is about time, geology about rocks, botany about plants, or ethnology about race, it follows that location is the primary fact of geographic environment; all others depend upon it. Merely to state the location of a city, a people, or a plant is to tell a great deal about its character and development.

THE UNITED STATES

Industrial Prosperity.—Despite difficulties in several branches of industry in the United States,—possibly because of overproduction in large part—the country as a whole has been prosperous. The farm situation is improving; the textile industry seems to be gaining though the migration from New England to the southern Appalachians and the Ozarks continues; the coal and lumber businesses are suffering a serious "slump"; and other industries are marking time. The railways are prospering; the telephone, telegraph, and radio businesses are flourishing; the automobile companies are generally extending their plants; the petroleum industry is optimistic as it progresses toward control of production. Inevitably the rich heritage of the United States in its extraordinarily favorable location, its white man's climate, its young fertile soils, its forests and grasslands and croplands, its wealth of mineral and power resources places it in a most favorable position in the struggle for economic supremacy among the nations, and its desire to insure to its peoples a high standard of living.

Surveys and Studies.—The nation is just awakening to the wonder of this heritage and taking actual inventory of its advantages and resources. Michigan has engaged in a most comprehensive land economic survey; Kentucky has carefully surveyed its resources; Vermont is exhaustively studying the physical background and the social and economic conditions of its people; Wisconsin is inaugurating a similar survey; New York is launching a five years' project of survey and land utilization that will require the expenditure of $100,000,000 in five years; the states of the Eastern cottonbelt are considering similar surveys; and the United States Department of Agriculture is not only cooperating in such of these surveys as it can, but also continues its program of typical studies and surveys about the whole country. The mineral and manufacturing interests are engaging in similar surveys; even the recreational and resort businesses are carrying on extensive investigations. All these, dominantly geographic in character, are merely an indication of the work to be done and the need for trained workers.

CANADA

Pioneering and Development.—Canada, one of the most progressive and prosperous states in the British Commonwealth of Nations, sets the pace for the world in pioneer occupation of new lands and development of unutilized resources. Within almost a half century she has settled and brought in to fruitful production most of her great grassland farming empire lying west of Lake Superior and Hudson Bay; developed the power, pulpwood, and other industries of Ontario, Quebec, and the Maritime provinces; discovered and exploited vast mineral deposits throughout her broad domain; and extended her roads, railways, and sea-routes from coast to coast, from the Great Lakes to Hudson Bay and the shores of the Arctic.

Geophysical and Economic Features.—Canada is a land of variety in people, in history, in character of climate, soil, and relief, in resources and industries. The staid, conservative population of the French sections of Quebec, or the Scotch villages of Nova Scotia and New Brunswick constitute a striking contrast to the restless, progressive English and Americans along the Great Lakes and on the western prairies; the long-established customs and culture of Halifax and Montreal founded centuries ago are at striking variance with the glaring newness and primitiveness of Edmonton and The Pas, founded a decade or so ago; the hardwood plains of southern Ontario are quite unlike the spruce- and fir-grown valleys of the Laurentian Plateau or the lodgepole pine slopes of the Canadian Rockies. The fishing fleets off the Nova Scotia banks; the ranks of reapers and combines in the Manitoba wheat fields; the power plants and pulp mills of the St. Maurice Rapids; the stampmills and concentrators at the mines of Ontario and British Columbia; the fur factories of Keewatin; the superbly appointed trains of the transcontinental railways, and the commodious steamers that dock at Vancouver and Montreal; all these indicate the diversity of the Dominion's resources.

Exploitation of Resources.—The development of Canada's industries and the exploitation of her resources is proceeding under most skilled and competent scientific direction and guidance, her Natural Resources Intelligence Service constituting one of the most efficient organizations of the kind in the world.

LATIN AMERICA

One of the most pressing problems of North American industry is the establishment of sound permanent geograhic and economic relationships with the other nations of the world, and in particular with those regions which by their dissimilarity to the United States create a natural field for interchange. The increase of trade with Latin America appears to be one of the possible solutions for part of the problem. The exploitation of new lands, new mineral deposits, new raw materials of all kinds in Latin America, requires great increase of population and invested capital there; and the markets originating in the nations under the direction of which this activity is taking place should be one of the outlets for surplus American products. These markets must be gained by friendly contact, friendly service and coöperation, which are attainable only by deep understanding and appreciation. Chile supplies North America with nitrates and copper; Brazil, with coffee; the Caribbean lands, with fruit and coffee, petroleum and sugar; Bolivia, with tin; and thus the whole list of Latin American nations has something that the United States needs. In turn, the United States has a wealth of manufactured goods and other products to sell to them.

AUSTRALASIA AND CHINA

Australia is undergoing an economic crisis of the first magnitude, for the cost of production of her chief commodities is not sufficiently lower than that of her competitors to offset the cost of transporting them to possible markets. The greater part of Australia is too arid for even pastoral agriculture, and only limited coastal stretches offer opportunity for further development. The sugar industry along the northeast coast offers one important field for expansion, but wheat-growing and wool-growing are languishing.

New Zealand has recently developed a remarkable dairy industry, particularly in butter-making, whereby it is successfully competing in the markets of Europe, America, and elsewhere in a field where Denmark, Switzerland, and similar lands had been supreme.

China is awakening. Throughout her history she has been dominantly an agricultural country. Her great areas of best lands have been intensively tilled and densely populated; her vastly greater areas of sub-marginal lands have been unoccupied, for lack of power, machinery, and capital have confined her farmers to the fertile lands where by human labor they could gain a living from the few acres they could till by primitive methods. The pressure of population has been mercilessly heavy upon the restricted areas of productive land. A new day is dawning in Chinese agriculture. Modern methods are supplanting the old primitive system, capital is slowly but surely becoming available, and power and machinery are being introduced. More than 2,000,000 farmers have moved from the densely populated districts about Shantung and Peking to the drier lands of Manchuria and eastern Mongolia within the last few years, there to take up successful dry farming, relieving the population pressure upon the lands whence they came. Simultaneously the development of machine industry in the cities along the coasts, the rivers, and the railways is going on apace and millions more of the dense farm population are being employed in the shops and factories, thus further relieving the congestion. How far this industrialization can proceed is an open question, for China's available supplies of coal and iron seem inadequate to sustain such colossal industrial activities as flourish in eastern United States and western Europe. The new developments in China promise a happier future for her great people. The expansion of agriculture, and the utilization of her manufacturing resources in great industries, will surely raise her standards of living, and stabilize her economic and political life.

EUROPE

Europe is regaining much of her pre-war economic strength. France is perhaps most substantially recovered, the resources of the Saar Basin and Lorraine having been at her command for rehabilitation. Germany, despite her heavy losses of territory, colonies, and resources, has managed to rebuild her industrial structure, though the heavy reparations she has had to pay have been a handicap. Italy, under the strict régime of Fascism, is making the most of her excellent location and limited resources, and enjoys relative peace and prosperity. Russia seems to be emerging from the economic eclipse consequent upon her great political and social experiment. England's geographical advantages have never stood her in better stead than during the past post-war decade and her economic strength is consequently resuming its wonted vigor, not without much travail, however. In all these countries and with the remainder of the European lands as well, the United States is becoming a powerful trade factor both for imports and exports.

PUBLICATIONS

Periodicals.—Excellent articles in the field of economic geography are appearing in many of the popular magazines of the United States and other countries, but for authentic data *Economic Geography, The Geographical Review, Foreign Affairs*, and *The Nation's Business*, contain the richest material for the research worker. The series of articles on "Agricultural Regions of the World" has been continued throughout the year by Dr. C. F. Jones on South America and Dr. O. E. Baker on North America, in *Economic Geography*. The *Commerce Yearbook* for 1929 and the numerous other publications of the United States Departments of Commerce, Agriculture, and Labor constitute a veritable mine of valuable information.

Books.—Important books issued during 1929 include: *Petroleum and Coal, The Keys to the Future*, by W. T. Thom, Jr.; *Tree Crops; A Permanent Agriculture*, by J. Russell Smith; *Finland, The Republic Farthest North*, by Eugene Van Cleef; *American Foreign Relations, 1929*, by the Council on Foreign Relations; *Raw Materials of Industrialism*, by Hugh B. and Lucy W. Killough; *Economic Resources and Industries of the World*, by Isaac Lippincott; and *The Recovery of Germany*, by James Angell.

CARTOGRAPHY

By W. L. G. Joerg

Editor, *Research Series*, American Geographical Society

AVIATION MAPS

Sectional Map of United States.—The continued rapid growth of aviation and especially of amateur flying has brought to the fore the need of an aviation map covering the whole of the United States instead of particular routes only. The strip maps hitherto issued (see American Year Book, 1925) represent belts of territory mainly along established airways and leave unmapped large areas in between. The Aeronautics Branch of the Department of Commerce, through the charting division of the U. S. Coast and Geodetic Survey, proposes to meet this need by undertaking to prepare a sectional aviation map of the United States. The original proposal as published with an index map in the *Air Commerce Bulletin* for Aug. 15, 1929, called for 82 sheets on the scale of 1:500,000 (the same scale as that of the strip maps), each comprising 3° of latitude by 4° of longitude. Subsequently, on the amended recommendation of Nov. 12, 1929, of the Committee on Aerial Navigation Maps of the Federal Board of Surveys and Maps (as to this Board see American Year Book, 1926), this plan was changed to make the sheets conform to the subdivision of the International Map of the World on the scale of 1:1,000,000. Each sheet of the United States map, because on twice as large a scale as the International Map, will be made to cover one half (a lower and an upper) of an International sheet, *i.e.*, it will embrace 6° of longitude and 2° of latitude. In this form the United States map will comprise about 85 to 90 sheets. The decision to fit into the international scheme is most fortunate in the interest of economy and efficiency.

Recent Airway Strip Maps.—Under the plan for the publication of the sectional map only a limited number of new strip maps will be produced, but those already published will be corrected and reissued from time to time as needed until they are superseded by the sheets of the sectional map. New strip maps published since the 1927 AMERICAN YEAR BOOK report (p. 610) cover the following routes: Department of Commerce series, Salt Lake City-Los Angeles (3 sheets), Cheyenne-Pueblo (1 sheet), Moline-Oklahoma City-Dallas (4 sheets), Milwaukee-St. Louis (3 sheets), Cleveland-Louisville (1 sheet), Washington-Atlanta-Birmingham (4 sheets), Buffalo-Albany (1 sheet); Air Corps Series, all the remainder; Hydrographic Office series, Hampton Roads-Cape Lookout, Charleston-Jacksonville, Gulf Coast from Key West to New Orleans (3 sheets, western coast of Caribbean from Miami and Havana via Cape Catoche, Yucatan, to Panama (6 sheets), Pacific Coast from San Diego to Vancouver Island (6 sheets), special map of San Diego area, 1:250,000.

Aviation Map Conference.—At the invitation of the American Geographical Society a conference was held at its building in New York Oct. 26, 1929. Its purpose was to discuss the general problem of aviation maps with a view to shaping the development of those produced in this country to meet more fully than at present the real needs of aviators. The conference was attended by fourteen persons, including representatives of commercial flying companies and the three government bureaus mentioned in the preceding paragraph. An executive committee was appointed which is to prepare an experimental map. Full coöperation with the government bureaus concerned is assured; indeed, it is intimated that the committee's final recommendations will be incorporated in the sectional map of the United States referred to above.

GEOLOGIC STATE MAPS

The series of state base maps on the scale of 1:500,000 published by the U. S. Geological Survey (AMERICAN YEAR BOOK, 1915, p. 607) is proving more and more an indispensable framework on which to plot various distributions. In the period under review a number of geological state maps have appeared using this series as a base: Arkansas, by G. C. Branner, published by Arkansas Geological Survey, 1929; Florida, by C. W. Cooke and Stuart Mossom, 1929 (in *20th Ann. Rept.* Florida State Geol. Survey); New Mexico, by N. H. Darton, 1928, U. S. Geological Survey; Oklahoma, by H. D. Miser, 1926, U. S. Geological Survey; Virginia, by W. A. Nelson, 1928, Virginia Geological Survey.

CITY MAPS

Regional Plan of New York.—Among city planning studies undertaken in the United States one of the most important and thorough is that of New York carried out with funds from the Russell Sage Foundation at a cost of $1,000,000 by the organization known as The Regional Plan of New York and Its Environs. After seven years of research final reports have just appeared, 12 volumes in number. The study really culminates in the map of the metropolitan region showing the use to which the different parts of the region had best be put to insure a normal and healthy growth. The map is on the scale of 1:62,500, or practically one inch to the mile; the topographic sheets of the U. S. Geological Survey are used as a base and on this are overprinted in colors the existing and proposed land uses, viz., business, industrial, and residential. In addition existing and proposed highways, parkways, and railroads are shown. The map is published in two forms: (1) in 24 sheets, each sheet corresponding to a topographic sheet, (2) and as part of the handy-size atlas volume, in which each page represents a quarter of a topographic sheet.

Topographic Sheets of Cities.—In the carrying out of its task of making a topographic map of the United States the U. S. Geological Survey has departed from its usual scales of 1:62,500 and less to portray several metropolitan areas on a large scale. To these belong the maps in 1:24,000 of the Los Angeles area in 39 sheets and of Chicago and vicinity in 24 sheets. The application of the precise methods of the Survey to these areas, including a true geometrical representation of the built-up sections, has produced tools of research in city geography hitherto unequaled in this country, except by the municipal surveys of Baltimore and Cincinnati.

LAND CLASSIFICATION MAP OF FINLAND

A map absolutely unique is the combined land classification and population distribution map of Finland on the scale of 1:1,000,000 in the new third edition of the well-known *Atlas of Finland* (Pls. 13-16, Helsingfors, 1928). Here, on the scale of a general map, *i.e.*, within a small compass, one may see in its proper shape and relative size every patch of cultivated ground, swamp, forest or bare rock throughout the country. The pattern of the map is that of a delicate mosaic; the technical excellence reflected in engraving and printing such detail would alone entitle it to high merit. Inasmuch as there is superposed on the physical basis the distribution of population by the dot method (black dots of varying sizes representing from 400 to 200,000 persons each) the map constitutes practically a complete picture of the static elements of the human geography of the country.

AMERICAN EXPLORATION

By Robert M. Brown

Professor, Rhode Island College of Education

POLAR EXPEDITIONS

Sir Hubert Wilkins reached South America in February, 1929 from his Antarctic air exploration. Wilkins used Deception Island of the South Shetland Island group at about latitude 63° S. as his base of operations. He reached this station on November 6, 1928. Two flights over Graham Land were made. The first during December, 1928 reached a point about latitude 71° S and covered for the entire journey 1200 miles. It was definitely established by this flight and a similar one in January, 1929, that Graham Land was not a peninsula of the Antarctic continent but two large islands with a series of smaller ones. Most of the flight was over area already seen but south of latitude 68° S entirely new ground was covered. The water separating the islands from the large land area to the south was named Stefansson Strait, and the main land which may or may not be a part of the Antarctic Continent was named Hearst Land. The expedition was the Wilkins-Hearst Antarctic Expedition, 1928-1929.

Byrd and MacMillan.—Commander Richard E. Byrd reached the Ross Sea in December, 1928 and established his base in the Bay of Whales where he proposes to remain for two years. Flights were begun almost immediately. During January a flight beyond Scott Nunatuks and Alexandra Mountains showed a new range of mountains, named Rockefeller Range, lying within the Ross Sea Dependency. During February, a new region outside the Dependency was seen and claimed for the United States under the name of Marie Byrd Land. Preparations for extensive exploration during the second season have been made. A geological expedition to Queen Maud Mountains is being rendered as safe as possible by the establishment of depots at brief intervals to within 200 miles of the mountains. These depots are being stocked with food and are to serve as way marks. Lieut. Commander Donald B. MacMillan was in the Arctic region during the summer collecting specimens.

TRANSATLANTIC AIR FLIGHTS

The Graf Zeppelin made a second visit to the United States in August, 1929. The dirigible left Friedrichshafen on July 31 and reached Lakehurst, New Jersey on August 4 after an estimated flight of 5,331 miles. This was said to be preparatory to a round the world flight. On August 8, the Zeppelin left Lakehurst and arrived at Friedrichshafen on August 10 (4200 miles in 55 hours, 23 minutes); left Friedrichshafen on August 14 and reached Tokio on August 19 (6880 miles in 101 hours, 50 minutes); left Tokio on August 23 and reached Los Angeles on August 25; and finally reached Lakehurst again on August 29, 21 days after her departure. The ship carried a passenger list of 19 or 20 persons and a crew of 40 and was in constant touch with the world by means of her wireless outfit. The flight from Friedrichshafen to Tokio was the longest ever made.

The Yellow Bird.—The giant French monoplane, Yellow Bird, with Jean Assolant, Rene Lefevre, Armeno Lotti and a stowaway left Old Orchard, Maine, at 9:10 A. M. (E. S. T.) on June 13, and landed on Comillas Beach near Santander, Spain, at 3:30 P. M. (E. S. T.) June 14, after a flight of approximately 3475 miles in 29 hours and 50 minutes. This was the eighth eastward crossing of the North Atlantic Ocean and the sixteenth time that the ocean has been crossed by the heavier-than-air machines.

Williams and Yancey.—On July 8, Roger Q. Williams and Lewis A. Yancey left Old Orchard, Maine, for Rome in their monoplane, Pathfinder, and were forced to land because of lack of fuel at Albericia, Spain, on the afternoon of July 9. The Pathfinder passed over Comillas, the landing place of the Yellow Bird, but continued in the air but one-half hour longer before coming to ground five miles from Santander. The plane was estimated to have covered 3410 miles in 31 hours and 42 minutes.

Diteman.—On October 22 Urban F. Diteman Jr. set out from Harbor Grace, N. F. in an open cockpit Barling Monoplane, Golden Hind, leaving a note stating that he was bound for London. No trace was ever found of him.

THE CARNEGIE CRUISE

The non-magnetic ship *Carnegie*, making its seventh cruise for magnetic, atmospheric and oceanographic observation, sailed from Newport News in May, 1928 for Plymouth England; on July 20, 1928 it reached Reykjavik, Iceland, the Barbadoes on Sept. 17, and Callao on January 14, 1929. From this station came the report that a new submarine ridge, named Merriam Ridge, was discovered about latitude 24° S and longitude 82° W. *The Carnegie* left Callao early in February and reached Papeete, Tahiti, on March 13. In this passage a new ocean deep, named "Bauer Deep" and two uncharted submarine ridges were discovered. The vessel left Papeete on March 20 for Apia, Western Samoa, and Pago Pago, American Samoa; and then to Guam (May 20) and Yokohama (May 25). In this passage another deep, "Fleming Deep," was discovered. The work which includes determinations of magnetic declination, investigations of magnetic intensity and inclination, soundings, collection of bottom-samples, pilot balloon flights, determinations of evaporation, and atmospheric-electric observations has been successfully carried out according to reports from San Francisco which *The Carnegie* reached late in August, 1929. Further sailings will carry the vessel to Hawaii, Samoa, New Zealand, where she is due in January, 1930, then around Cape Horn, making a loop in the South Atlantic to Cape Town (July 1930); over the Indian Ocean to Australia (Sept. 1930); New Zealand (January 1931); Buenos Aires (March 1931); looping the North Atlantic to Panama (Sept. 1931); Hawaii (Nov. 1931); and ending the cruise at San Francisco in December 1931.

FIELD MUSEUM OF NATURAL HISTORY

Abyssinia.—The Harold White-John Coats Abyssinian Expedition has been in Abyssinia, Kenya Colony and Tanganyika Territory to collect mammals and birds, a special objective being specimens of the reticulated giraffe.

Eastern Asia.—During November, 1928 the first contingent of the William V. Kelley-Roosevelt Expedition to Eastern Asia left for French Indo-China, the territory along the Mekong

River and the borders of Burma, Siam and Yunnan. The leaders are Colonel Theodore Roosevelt and Kermit Roosevelt. A second contingent left in December, 1928. The main object of the expedition was the collection of zoölogical specimens and pure exploration.

The Crane Pacific Expedition sailed in November, 1928, for a year's cruise of the Pacific to collect zoölogical specimens from the Pacific islands and the East Indies. The itinerary includes Hayti, Panama, Galapagos, Marquesas, Tahiti, Cook, Harvey, Figi, The Solomons, New Hebrides, New Guinea, The Moluccas, Celebes, Borneo, Komodo, Lombok, Bali, Java, Singapore, Saigon, Bangkok, Canton, Formosa and Japan. The expedition travels in Mr. Crane's brigantine yacht, *The Illyria*, just built and specially fitted for the purpose. The *Illyria* which was reported as lost, later reached Tahiti. It is expected that the expedition will cover about 30,000 miles.

Miscellaneous.—The Museum has sent out during 1929 in addition the above eleven expeditions including two archæological, one to the sites of the Maya civilization in British Honduras and one to Mesopotamia to excavate the site of Kish; one ethnological expedition, to Angola and Nigeria; two botanical, to the Amazon and to Peru; three zoölogical, to the Arctic, to India, and to the South Pacific; one oceanographic, to Bahaman waters; one ornithological to Arizona and one geological to New Mexico.

UNIVERSITY EXPEDITIONS

Yale.—G. Proctor Cooper of the Yale Forest School, has returned from a year's investigation of the forest of Liberia, Africa. This area typical of the conditions found over a large area will have a practical bearing on much of the future work in the area. The expedition collected a series of birds from the tropical evergreen forests, forest insects mostly butterflies and beetles, and the barks, leaves and fruits from 75 of the important trees used in native medicine and witchcraft which are to be studied by pharmaceutical chemists for the discovery of powerful and deadly alkaloids.

Stanford University sponsored an expedition into Lower California and Sonora, Mexico, for geological investigations including field exploration, shore collecting, dredging and bottom sampling.

The Princeton-Buffalo Expedition went to the West Indies for an oceanographic and stratigraphic survey of the Bahama region. The purpose was to complement the first expedition undertaken during the winter by a study under summer conditions and maximum temperatures.

The Harvard University Expedition to study tropical medicine in Yucatan selected for its headquarters the ruins of the ancient city of Chichen Itza where is situated a famous sacrificial well of the aborigines. A study of the diseases of the natives is planned which it is hoped will throw light upon the causes of the complete collapse of the once prosperous Maya civilization.

Columbia University in connection with the American Museum of Natural History has organized an expedition to seek adult specimens of the Gorillas for anatomical and anthropological study. The route of the expedition will be from Dares-Salaam the port of entry of East Africa, to Tanganyika, Kivu plateau, and thence down the Congo River to the West Coast. Dr. William K. Gregory, leader of the expedition, reported in August that one large gorilla had been obtained. Work of photographing will be attempted.

Northwestern University.—The second expedition to Dutch Guiana for the study of the Negro located in the upper reaches of the Surinam River to note the customs, laws, beliefs and language of the people.

University of Michigan.—The aerological observatory of the University of Michigan located at Mount Evans in southwest Greenland after a continuous period of observations covering two years was closed late in July 1929. Meteorological data covering the entire period both surficial and at varying altitudes are now being edited.

OTHER EXPEDITIONS

Galapagos.—An expedition headed by Gifford Pinchot sailed from New York on a three-masted topsail schooner to study the Galapagos and Pitcairn Islands. The party plans a 3,000 mile cruise among the Pacific Islands to collect specimens for the National Museum, the Carnegie Museum of Pittsburgh and the Philadelphia Academy of Sciences.

Northern Iraq.—The British-American Expedition for archeological research has completed its season's work in Northern Iraq and is reported to have gained much added knowledge on old Stone Age cultures and races, and to have proved correlations between the culture of the Stone Age with that of the Aurignacian of central Europe.

Bermuda.—The Beebe oceanographic expedition to Bermuda, the twelfth of the tropical series of the New York Zoölogical Society, has been unusually successful. The work, confined to a small area south of Nonsuch Island, has been a study of ocean life from the surface to 1400 fathoms and has yielded about 100,000 specimens of life particularly of deep-sea and pelagic fish.

Madagascar. — Dr. Charles F. Swingle of the Bureau of Plant Industry at Washington returned from Madagascar where a search was made for ornamental shrubs and plants of the rubber family. Many live plants and seeds were brought back which will be tested for adaptation in the United States and 23 species which have some promise of yielding rubber. The real prize consists of live specimens of an almost extinct species of rubber yielding plant which had been highly prized for making automobile tires.

Central America.—A new phase of exploration was experienced when Col. Charles A. Lindbergh with Dr. Alfred Kidder and Dr. Oliver Ricketson flew back and forth over the jungles which held the Maya civilization. It is claimed that there was accomplished in five days what under the best conditions on the ground could not be accomplished in five years, while a few centers of the Maya civilization have been known, the full sweep of them in Yucatan, Guatemala, Honduras and British Honduras is only now appreciated.

AMERICAN MUSEUM OF NATURAL HISTORY

Mongolia.—During 1929 the Museum expeditions have visited and collected materials in thirty different localities throughout the world. The Central Asiatic Expedition has been obliged to discontinue operations in Mongolia owing to the disturbed conditions in China. Many of the members have returned to this country.

Bird Collecting. — The Whitney South Sea Expedition has been in the field for a number of years and during the past year bird collecting in the Solomon Islands under the leadership of Hannibal Hamlin has been the objective. Bird collecting was also continued by the Tyler-Duida Expedition of 1928 at Mt. Duida, Venezuela; by the American Museum Tanganyika Expedition to Lake Tanganyika; by Mr. Beck in New Guinea; by the Olalla Brothers in Peru and Ecuador; by Mr. Kaempfer in Brazil; by Mr. Correia in Sao Thome Island; and Dr. Chapman in Panama, where he is also studying the life histories of the birds of that locality.

Miscellaneous.—The Department of Ethnology has representatives in the Admiralty Islands and Dutch Guiana. The Department of Anthropology has six parties in the southwestern sections of the United States and in Mexico studying the evidences of prehistoric man and collecting archæological materials. Mammals have been added to the Museum collections by the Sanford-Legendre Expedition to Abyssinia; by Mr. Vernay in India; by the Morden-Graves Expedition in Central Asia and by the Ottley-Anthony Expedition to South America.

COGNATE SOCIETIES

AMERICAN GEOGRAPHICAL SOCIETY, Broadway at 156th St., N. Y. C.

ASSOCIATION OF AMERICAN GEOGRAPHERS, University of Minnesota, Minneapolis, Minn.

EXPLORERS CLUB, 544 Cathedral Parkway, New York City.

GEOLOGICAL SOCIETY OF AMERICA, Columbia University, New York City.

HARVARD TRAVELLERS CLUB, 41 Walden St., Concord, Mass.

NATIONAL GEOGRAPHIC SOCIETY, Washington, D. C.

NATIONAL SLATE ASSN., 644 Drexel Bldg., Philadelphia, Pa.

SOCIETY OF ECONOMIC GEOLOGISTS.

DIVISION XXI

CHEMISTRY AND PHYSICS

INORGANIC AND PHYSICAL CHEMISTRY

By Hugh S. Taylor
Professor, Princeton University

MOLECULAR HYDROGEN

The outstanding event of 1929 in the field of chemistry is the experimental demonstration that molecular hydrogen is not a simple substance but is, at ordinary temperatures, a mixture of two forms present in a ratio of 1:3. This conclusion was predicted on the basis of the new wave-mechanical treatment of molecular structure and the analysis of the hydrogen spectrum. The demonstration and a preparation of one of the modifications of hydrogen, parahydrogen, in a state of purity was achieved by two young physical chemists in Berlin, Bonhoeffer and Harteck. They found that, at the temperature of liquid hydrogen, charcoal acts as a catalyst in converting ordinary hydrogen gas, a mixture of 1 part parahydrogen with 3 parts orthohydrogen into *pure* parahydrogen. Parahydrogen so prepared is quite stable in glass vessels even up to red heat. It is, however, readily converted into the normal 1:3 mixture in contact with platinum as a catalyst at room temperature. At the boiling point of ordinary hydrogen it has a vapor pressure 27 mm. higher than normal hydrogen. Its specific heat and heat conductivity differ radically from the ordinary one : three mixture. Its spectrum is that of the weak lines in the ordinary hydrogen spectrum.

These differences are peculiar to the *molecular* form of hydrogen. There are no such differences in hydrogen atoms. The differences arise from a divergence in the architecture of the two molecules. The modern view is that electrons and nuclei both have spins and the combination of two spinning nuclei and two spinning electrons may occur in such a manner as to produce two wave-functions, the one symmetrical, the other antisymmetrical. Orthohydrogen and parahydrogen are the two entities that modern mathematical physics endows with these wave properties. Such a discovery produces several results. It fortifies the theoretical discussion which has preceded it: it suggests a search for other divergences of a similar nature. Bonhoeffer and Harteck have sought such in water vapor without success. Other molecules may also be studied from the same point of view.

ISOTOPES

Physical weapons have also furnished another set of discoveries in respect to the elements. The study of radioactive change established the existence of isotopes—elements with the same atomic number but different masses. Aston then showed the general existence of such istopes even in non-radioactive matter and established the whole number rule. Chlorine with an atomic weight of 35.46 was shown to be a mixture of two isotopes of masses 35 and 37. Aston's studies, however, always gave carbon and oxygen a clean bill of health. Carbon was a simple element, mass 12, oxygen also simple, mass 16. Now, with the aid of intensive study of the band spectra of these two elements it has been discovered that even these are mixtures of isotopes. Giauque and Johnston in California (*J. Am. Chem. Soc.*, **51**, 1436, 1929) have shown the presence in the spectra of oxygen of faint bands indicating the existence of oxygen of mass 18. Fortunately the amount of oxygen, 18, present is so small that atomic weight determinations based on oxygen = 16 will not be affected except in the remote possibility of non-uniform distribution. In a similar manner Birge has indicated the existence of carbon atoms, mass 13.

HALOGEN OXIDES

A whole series of associated researches in the University of Berlin have extended our knowledge of the oxides of the halogens and nitrogen and have also yielded new compounds. The interaction of ozone and bromine has led to the preparation of an oxide $(Br_3O_8)_n$ (Lewis and Schumacher, *Z. anorg. Chem.*, **182**, 182, 1929). It is prepared below *10°C.* and is attended, in presence of impurities on the glass walls of the containing vessels or at higher temperatures, with strong explosions in which no oxide is produced and the ozone is rapidly decomposed. The oxide can only be kept for long periods of time below *—80°C.* There are two crystal modifications which are interconvertible above and below *—35°C.* It is soluble in water giving rise to a series of acids, $H_4Br_3O_{10}$ which decomposes to H_2BrO_4 (cf. H_2MnO_4) and $HBrO_3$ with evolution of oxygen. Chlorine and ozone apparently react thermally according to Bodenstein, Padelt and Schumacher (*Z. physik. Chem.*, **5B**, 209, 1929) to give the oxides ClO and ClO_2. This latter with excess ozone gives ClO_3 and oxygen at a very rapid rate. This chlorine trioxide can react in two ways, either polymerizing to form chlorine hexoxide Cl_2O_6 or decomposing to form $Cl_2 + 3O_2$. At higher temperatures the latter predominates, at room temperature or lower the former mainly occurs. Illumination of chlorine dioxide in glass vessels also produces the hexoxide presumably by way of ClO_3. These studies of the chlorine oxides have permitted a consistent interpretation of the action of light in the decomposition of chlorine monoxide and the sensitized photo decomposition of ozone by chlorine (Schumacher and Wagner, *Z. physik. Chem.*, **5B**, 199, 1929).

UNIMOLECULAR REACTIONS

The interaction of nitrosyl chloride ($NOCl$) and ozone have been shown to yield the compound nitryl chloride NO_2Cl, in the pure state as a colorless gas stable up to *120°C.* in glass vessels (Schumacher and Sprenger, *Z. anorg. Chem.*, **182**, 139, 1929). The gas condenses at atmospheric pressure and *—15°C.* to a heavy colorless liquid. At *—145°C.* it solidifies to a white crystalline mass. Its decomposition is of interest in that it is another example of that steadily growing group of quasi-unimolecular gaseous decompositions of which five years ago there was one lone example, that of N_2O_5 (Schumacher and Sprenger, *Z. Elektrochem.*, **35**, 653, 1929). Ramsperger has studied (*J. Am. Chem. Soc.*, **51**, 2134, 1929) methyl di-isopropyl di-imide as a new member of this class of decompositions, while Hinshelwood has extended the list by additional studies of decomposition of ethers (Glass and Hinshelwood, *J. Chem. Soc.*, 1804, 1929). For the explanation of these reactions there has grown up recently an enormous theoretical literature. The earlier assumption that such reactions involved the interaction of the thermal radiation of the environment with matter is now definitely abandoned. It has been shown that the energy required for decomposition is acquired by collisions with other molecules but that the time interval between activation and decomposition is long compared with that between collisions which cause de-activation. A good summary of this field was given by O. K. Rice in the *Report*, published this year, of the Réunion Internationale de Chimie Physique at Paris, October, 1928. Polanyi and Wigner (*Z. physik. Chem.*, **139**, 439, 1928) have discussed the mechanism whereby the activation energy is distributed through a large molecule and thus deduce theoretically a rate of such reactions.

PHOTO ACTIVATION

Norrish in Cambridge, England, has just completed an important series of researches on the photochemical decomposition of nitrogen peroxide (*J. Chem. Soc.*, 761, 1927; 1157, 1604, 1611, 1929). This study indicates one reason for the general observation that the activating energy required for photochemical change is generally much larger than the energy required for the same change in the thermal reaction. In Norrish's case about 30,000 calories per $2NO_2$ is required thermally whereas the absorption of light energy equivalent to an Einstein per mol ($= Nh\nu$ *per mol*) of 64,000 cals. is inadequate to produce decomposition, 70,000 cals. is about 35 per cent efficient in producing decomposition, while light energy equal to 80,000 calories is 100 per cent efficient in decomposing the gas. Norrish now finds that part of the absorbed light energy at or below 70,000 calories per Einstein is re-emitted as fluorescence. This points to a restriction on the convertibility of the light energy absorbed, only a definite portion being available for chemical activation, the rest remaining as electronic excitation and re-emitted as fluorescent light after an interval of time on the order of 10^{-8} secs.

REACTIONS AT SURFACES

The principal topic at the annual meeting of Bunsen Gesellschaft in Berlin this year was heterogeneous catalysis, an international symposium having been arranged. It is now generally agreed, as the result of postwar studies, that the surfaces at which reactions are accelerated are non-uniform in nature and that centers of differing activity from the very active to the inactive may be present. This conclusion gives a compelling explanation for the technically important phenomenon of sensitivity of surfaces to heat-treatment and poisons, and also that of promoter action whereby surface activity may be enhanced by incorporating with the contact agent proper a promoter, itself of little activity. There is now general agreement that the atoms in corners, edges and surface discontinuities are the more active atoms in such contact actions. A series of researches published this year deepen our knowledge of the behavior of such surfaces.

Rupp of Berlin has applied a new tool in the study of such surfaces by examining the reflexion of electrons from catalyst surfaces in the absence and presence of gases which might react on such surfaces or which, by poisoning, might prevent other gases from reacting (*Z. Elektrochem.*, **35**, 586, 1929). Thus, nickel, which on a clean surface shows maxima of reflexion at definite intervals of the square root of the volt-velocities of the impinging electrons, shows in presence of adsorbed hydrogen new additional maxima at volt-velocities mid-way between those of the clean surface. The nickel maxima become somewhat flatter. The new maxima are attributable to a lattice of hydrogen built in to the nickel lattice. By longer contact of hydrogen with the nickel, the lattice of the latter becomes loosened—for what reason is not yet known—and the nickel maxima slowly disappear. If nitrogen is brought into contact with such hydrogenized nickel surface the hydrogen maxima disappear presumably by reaction to form ammonia. This does not occur unless the nickel lattice has been affected by hydrogen admission. With hydrogen sulphide as the adsorbed gas one experiment indicated the formation of nickel sulphide.

With an iron surface the lattice loosening of iron takes place so rapidly that it is not possible to recognize the individual steps. Hydrogen immediately destroys the iron lattice and builds itself into its own regular lattice. Nitrogen acts similarly probably due to slight impurities of hydrogen. With nitrogen and hydrogen together there is an immediate reaction and the iron maxima disappear immediately. The whole work is of extraordinary interest as it provides a new method of ascertaining what happens when gases are adsorbed on active surfaces. The method of reflecting electrons is superior to that of X-rays as the reflexion occurs at the surface and does not penetrate to the inner layers as do the X-rays.

The conclusions cited above concerning promoter action receive support from new work by Frankenburger and Mayrhofer (*Z. Elektrochem.*, 35, 590, 1929) on the adsorption characteristics of films of iron atoms laid down on surfaces from gaseous atoms of iron in presence of water vapor. Films so laid down apparently consist of individual iron atoms separated from one another by water molecules. Such films are yellow in contrast with the ordinary gray films of iron. The water molecules may be regarded as a protective colloid to the individual iron atoms or as a promoter to the iron in the sense of technical contact catalysis. Iron in such iron-ice films has extraordinary adsorptive capacity for hydrogen, taking it up in the ration $1\ H_2$ to $1\ Fe$. In the absence of the ice, the average adsorption of a similar iron film in complete absence of water would not be more than $1\ H_2$ to $8\ Fe$.

With nitrogen, no adsorption occurs on such iron-ice surfaces at the low temperatures necessary for the work. It would seem therefore that the effect of temperature is necessary to activate nitrogen and bring it into a reactive condition towards nitrogen for ammonia synthesis (see, however, the preceding results of Rupp).

The existence of active atoms in a surface necessitates that they shall have free energies of reaction greater than those of normal atoms and that consequently they shall give rise to different equilibria. This has been experimentally demonstrated on several occasions previously. A particularly interesting example of this has been found recently in the equilibrium between carbon dioxide and carbon monoxide on charcoal surfaces. (Dent and Cobb, *J. Chem. Soc.*, 1903, 1929). At *800°C.* equilibria between 7 per cent CO_2 and 14 per cent CO_2 may be obtained dependent on the nature of the surface charcoal surface, the surface with the active atoms giving the lower value of carbon dioxide in equilibrium.

MOLECULAR SPECTRA AND STRUCTURE

An elaborate symposium on this theme was conducted by the Faraday Society in Bristol, England, in September. Only the advance reports are yet available but these are sufficient to indicate that a considerable development in this interesting field of work is shortly to be expected. Contributions from many distant centers of research were received for this meeting and must now be assimilated.

ORGANIC CHEMISTRY

By Charles D. Hurd

Associate Professor, Northwestern University

RESPONSE OF METHANE TO VARIOUS FORMS OF ENERGY

Hydrocarbon chemistry, which has come to the fore in the past few years, has been a popular field in 1929. Furthermore, it is now attracting the attention of physical chemists to a greater extent than ever before, thereby introducing new methods of attack.

Fischer's discovery that the simplest hydrocarbon—methane—may be converted into benzene, naphthalene, etc., by the high temperature methods of pyrolysis has stimulated considerable research in that direction. In general, it seems essential to have a temperature above *1000° C.*, and to provide for a very limited heating period. Methane is thereby stripped of some of its hydrogen, and the remainder polymerizes to liquids and solids. H. M. Smith has been interested in this development, and Chamberlin and Bloom have reported that either methane or natural gas, whose methane content is high, may be used.

Other forms of energy than heat energy have been found to exert a profound effect of methane. Lind and Glockler have obtained a very complex mixture of liquids and solids by exposing methane, as well as other simple hydrocarbons, to a semi-corona (electric) discharge. To explain this building-up effect Lind postulates a clustering mechanism, followed by loss of hydrogen. Thus, methane first is considered to double to ethane, which, in turn, doubles to butane, and it to octane, etc. The energy from α-rays produces similar effects. Taylor has produced similar, but not equal, effects by the use of "excited" mercury atoms. This energy is transferred to the hydrocarbon by illuminating it with ultraviolet light of specific wave length, generated from a mercury arc the base of which is cooled in a water bath. Methane appears to be unattacked by hydrogen atoms or by excited mercury atoms. With all other hydrocarbons, however, there is decomposition into methane, hydrogen, and liquid products. Possibly, as Taylor suggests, these transformations proceed through intermediate, non-isolable radicals.

OTHER HYDROCARBONS

The pyrolysis of both butanes and of isobutylene has been studied by Hurd and collaborators. At *600° C.*, the two butanes (saturated hydrocarbons) break down into molecularly smaller compounds and yield almost no liquids. Isobutylene, however (an unsaturated hydrocarbon) gives rise not only to gases but also to liquids as a major effect, but a higher temperature is required to initiate the decomposition. The liquid is a mixture of benzene, toluene and other aromatics.

Butene-2 exists in two isomeric modifications, both of which have been prepared this past year in a high state of purity by Lucas. Theoretically, pentene-2 should also exist in these two isomeric types. Actually, two forms have been produced and purified, but Kharasch, Sherrill and Carr believe these to be electromers rather than geometric isomers. In other words, it is considered that the structural difference is essentially electrical rather than spatial. Even so, two space isomers should still be possible, and with a pair of electromers for each type, four pentene-2 isomers are conceivable. The evidence in favor of electromers is based on methods of preparation, on addition reactions with hydrogen bromide (one giving 2-bromopentane and the other 3-bromopentane), and on absorption spectra measurements. Interesting as this evidence is, most chemists regard this important theoretical problem as unsettled at the present time.

The preparation of all nine of the isomeric heptanes has been published by Edgar and Calingaert, and many physical properties of each one have been very carefully determined. In a similar study of isomerism, Reid has prepared in pure form twenty-three isomeric octyl alcohols and has measured a large number of their properties.

OXIDATION

Oxidation studies by Edgar on six of the octanes has given a clew as to the mechanism of combustion. Hydrocarbons appear to be attacked on the terminal carbon atom, momentarily to produce an aldehyde. It oxidizes at once into the next lower aldehyde by loss of carbon monoxide and continues to oxidize off carbon atoms in this manner till a ketone is formed. Lead tetraethyl appears to retard the oxidation of the aldehyde into lower aldehydes. Thus, in part at least, the function of lead tetraethyl in motor fuel seems to be that of lessening the tendency of the fuel to detonate by obstructing the chain reaction.

Pease has studied the oxidation of propane and the butanes, and Bibb and Lucas have shown that a 4% yield of formaldehyde may be obtained by passing a mixture of natural gas (85% methane), air, and a trace of nitric acid through a tube at *700-750° C.* so rapidly that the hot contact time is a half-second. Similarly, benzene and air may be catalyzed by traces of nitric acid so that a 5% oxidation into phenol is effected.

POLYMERIZATIONS

The production of liquids from gaseous hydrocarbons has been mentioned. Acetylene behaves similarly, and between *400-600°* Pease has shown that it yields not only benzene but also a complex of products of a wide range of volatility. Bridgman and Conant have subjected isoprene, styrene and indene at room temperature to pressures as high as 12,000 atmospheres, and have noticed an accompanying irreversible transformation into solids. This may be a property of dienes, since pentene had not been affected.

Because of its relation to such important materials as rubber, cellulose, proteins, resins, etc., the problem of the structure of polymers is attracting considerable attention. Kienle and Hovey have shown that the resins formed from glycerol and phthalic anhydride are the result of an intermediate esterification process which gels before completion. Lycan and Adams have produced intramolecular esters of ω-hydroxydecanoic acid which are polymers of the original acid, by heating the acid alone or in inert solvents. Carothers has developed the following generalizations regarding the nature of esters produced by the action of dibasic acids on dihydric alcohols. If the length of the structural unit is 5 atoms the ester cannot be polymerized. With a 6-atom structural unit, the ester is still monomeric, but may undergo reversible polymerization. If the length of the unit is greater than 6 atoms, the ester is polymeric and cannot be depolymerized. Esters of the last type are open chains of 100 to 300 atoms in length and bear functional groups at the ends.

ETHYLENE AND ITS DERIVATIVES

Some years ago ethylene, obtained by pyrolysis of natural gas, was successfully converted into ethylene glycol. The market for it as an automobile anti-freeze, and as an ingredient (as glycol dinitrate) in dynamite, and as a solvent (in the form of its ethers and esters) has been largely responsible for further commercial developments which are of great interest to organic chemists. Ethylene oxide has become available in large quantities, and Heckert and Mack have studied the course of its thermal decomposition. Kinetic studies of ethylene oxide in solution have been made by Brönsted and Kilpatrick. 1, 4-Dioxan is another rarity which has recently become available in semi-commercial quantities. The ethanolamines also are in this class; they may be regarded as reaction products of ammonia with either ethylene oxide or ethylene chlorohydrin. Trusler has shown that ethanolamine-oleate soaps are soluble in organic solvents and are effective in dry-cleaning. Hockenyos has used such soaps in an oil spray for the purpose of insect control.

These developments from ethylene have, by their magnitude, been responsible for another striking American development, namely, the commercial production of synthetic acetone from propylene. The latter is a by-product in ethylene manufacture. This acetone development is all the more striking in view of the large volume of fermentation acetone which is necessarily produced as a by-product in the butyl alcohol industry.

METALLO-ORGANIC COMPOUNDS

Several papers by Whitmore bear witness to the utility of organic mercury compounds in the synthesis of substances otherwise difficult or impossible to procure. Examples of such syntheses are 6-nitro-1-naphthoic acid, 2-iodo-3-nitrobenzoic acid, and 2-bromoisophthalic acid. Conant, Blatt and Webb have shown that organic magnesium halides (the Grignard reagents) add "normally" to aldehydes or ketones only in the simple cases. When the reactants are highly branched, three other types of reaction may also appear: reduction, enolization, and condensation. Gilman's continued studies with the Grignard reagent have provided an interesting observation that *o*-phenylbenzohydrylaniline was the reaction product when phenylmagnesium bromide reacted either with phenylisocyanate or with benzophenone-anil. Tetramethyl-tin has been described by Kraus, who also has prepared a fully methylated tin compound which contains four tin atoms in a chain. This decamethylstannobutane is a liquid.

SUGARS

The synthesis of sugar or sucrose, announced last year by Pictet, has been questioned by Irvine since, with apparently similar methods, he obtained an iso-sucrose rather than sucrose. For the first time the acetate of the free aldehyde form of glucose has been prepared. For this, Wolfrom used glucose-thioacetal as a starting material. In the technic of oxidation of an aldose by bromine water, Hudson and Isbell have shown the beneficial buffering effect of barium benzoate. That the cellulose unit is not $(C_6H_7O_2(OH)_{3x}$ but is $(C_{24}H_{28}O_8(OH)_{11}OH)$ is the opinion of Malm and Clarke, since acetic acid acetylates only one hydroxyl group out of every twelve. With hydrated cellulose, four hydroxyl groups (of the twelve) become acetylated.

Molds and new bacteria are coming into prominence as tools for the chemical utilization of sugars. The *Aspergilli* are at present the most important molds. They convert glucose into citric acid in quantity. Similarly, a *Penicillum* mold has been found to produce gluconic acid in satisfactory yields. A lactic acid bacterium has been developed by Peterson and Fred which ferments both pentoses and hexoses. It is stated to be capable of producing 300-900 pounds of lactic acid from a ton of sawdust, after preliminary acid hydrolysis of the sawdust into a pentose-hexose mixture.

MISCELLANEOUS

Ephedrine has come into wide usage as a drug in the past few years. Its synthesis, and the synthesis of related compounds, has been performed by Johnson. Anderson's isolation of phthioic acid from the tubercle bacilli is also noteworthy, as is Conant's work on hemoglobin and chlorophyll. Foster's isolation of di-iodotyrosine from the thyroid may also be mentioned. In McElvain's investigation on benzoate esters, he has discovered that 1-phenylethyl-4-piperidyl benzoate possesses about seven times the anesthetic power of cocaine, and is far less toxic.

Optically active organic compounds (those which rotate the plane of plane-polarized light) which fail to contain the customary asymmetric carbon atom (one holding 4 entirely different atoms or radicals) are rare, but in the diphenyl series they have been shown to exist. This is witnessed by Moyer and Adams' resolution of 3,3′-diaminodimesityl into optically active forms. The optically active terpene hydrocarbon, *d*-pinene, has been known for some years to lose its activity by heating at *200°* for several hours. This was regarded as a racemization process. In other words, the material after heating was regarded as a mixture of equal amounts of *dextro-* and *levo*-pinene. Conant and Carlson have demonstrated the fallacy of this by showing that the optical activity was lost because of rearrangement into dipentene.

Adkins has studied the effect of various catalysts in the decomposition of alcohols. Alumina induces the rearrangement of allyl alcohol into propionaldehyde, whereas zinc oxide gives rise initially to acrolein which then changes further into propionaldehyde. Catalytic conversions of ethyl alcohol into acetaldehyde and thence either into acetic acid or into ethyl acetate are two interesting commercial developments of the year. Of commercial interest also is the development of *o-* and *p*-phenylphenol as byproducts of the high pressure hydrolysis of chlorobenzene. Catalytic conversion of the latter by steam into phenol, using atmospheric pressure, a temperature of *500°*, and alumina or titania or silica gel catalysts, has been reported by Chalkley.

Suter has prepared many derivatives of diphenyl ether, which has recently become available in large amounts. A promising line of attack on the function of aluminum chloride in the Friedel and Crafts reaction has been inaugurated by Dougherty, who has shown that it causes a double decomposition of a mixture of alkyl halides. Finally, Fieser's determination of the reduction potentials of 43 phenanthrenequinones is deserving of especial mention.

ORGANIC SYMPOSIUM

The third national organic symposium was held in Princeton the closing days of December, 1929. Fourteen important papers and three colloquia were the features of the gathering.

AGRICULTURAL CHEMISTRY

BY W. W. SKINNER

BUREAU OF CHEMISTRY, DEPARTMENT OF AGRICULTURE

SUGAR

Pacific Scientific Congress.—The fourth Pacific Scientific Congress held in Batavia and Bandoeng, followed soon thereafter by the third Congress of the International Society of Sugar Cane Technologists held at Soerabaia, had for object the unifying and coordination of the scientific work of special interest to the countries bordering on the Pacific. Practically every Government interested was represented, including several delegates from the United States. Many papers related to some phase of agriculture in Java, especially the development of the Java sugar industry and its economic advantages and drawbacks. A number of resolutions of special importance were passed: (a) to secure uniformity in the classification and nomenclature of soils; (b) advocating the unification of methods of reporting field and factory results in sugar cane work, and (c) the formation of a special committee for the purpose of reviving the International Committee for Uniform Method of Sugar Analysis which has not functioned since 1912.

Sugar Industry of Louisiana.—Of special interest is the revival of the sugar industry of Louisiana, which has been suffering a period of depression due to the introduced mosaic disease of cane. In 1926 the production of sugar amounted to only 47,000 tons. Varieties of cane resistant to mosaic, distributed to the farmers several years before 1926 by the Department of Agriculture, proved so good in yield that a complete substitution of varieties is taking place as rapidly as the new seed cane can be made available. Confidence in the industry is being restored and abandoned plantations are being replanted. In 1929 the estimated production is about 220,000 tons from an acreage not materially greater than that of 1926. The expansion has created new research problems in the better utilization of the entire cane plant, including the bagasse, and in problems of sugar recovery and sugar house technology.

Sugar Cane Wastes.—Utilization of sugar cane bagasse has been a source of study for years. Production of building board from this material has given impetus to the study of methods for further utilization. This is a phase of the farm waste utilization program wherein the possible uses of stalks, straw, hulls, etc., of which millions of tons are discarded annually, are being investigated by the Department of Agriculture.

Sugar Investigations.—In England the investigation of Vecchis process of drying sugar beets has been continued. If such a process can be economically worked out, the manufacture of beet sugar will undoubtedly be revolutionized, for a few centralized plants operating on a yearly basis would replace the numerous factories now operating on a two to three months' basis. Such a development would greatly reduce the unit cost of production.

To eliminate the enormous waste of sugar in the form of beet molasses, one company in the United States has erected and successfully operated a plant for de-sugarizing Steffen molasses by means of a barium process.

Ordinary sugar (sucrose) is only one member of a very large family of substances. As time progresses other sugars are found to be of value. Dextrose or "corn sugar" has become a commercial article of large annual tonnage. The United States Bureau of Standards is studying the various phases of manufacturing levulose from artichokes, dahlias, etc., and xylose from cottonseed hulls. The Department of Agriculture has discovered means of economically producing betalactose, a more soluble and sweeter form of lactose, from surplus and waste milk products which is thought to have considerable commercial value.

PRODUCTION OF ORGANIC CHEMICALS

Molds as Manufacturing Agents.—The production of organic chemicals by fermentation will play an important rôle in our industrial development. Carbohydrates are frequently the raw material for these processes, which may be exemplified by the semi-plant scale production of gluconic acid by the action of Penicillium-Luteum Purpurogenum on glucose. This discovery by Herrick and May of the Department of Agriculture has made possible the production of this acid at a fraction of its previous cost of manufacture. The production of citric acid by the action of Aspergillus niger on dilute sugar solutions has been placed upon a commercial basis, 5,000,000 pounds of citric acid having been produced by this method in 1928.

FOODS

Special Food Problems.—Sando and Markley of the Department of Agriculture have investigated vegetable surface coatings, and have demonstrated that malol from apple peels, prunol from wild cherry leaves, and urson from bearberry leaves are identical; the formula $C_{30}H_{48}O_3$ and not $C_{31}H_{50}O_3$, as suggested by previous workers has been established and "ursolic acid" as the name of the compound has been accepted. The work on surface coatings has a direct bearing on the long unsolved problem of apple scald, and also on the adhesion and removal of sprays, and the resistance of plant surfaces to penetration by fungi and bacteria.

The Birdseye Quick-freezing Process.—This process was developed for the better handling of filleted fish, but has also been applied to other flesh products and fresh fruits and is now being tested in connection with the preservation of citrus fruit juices. The term "quick frozen" is used to designate products that have been frozen by direct immersion in a liquid refrigerant such as sodium chloride brine, or by indirect contact with a very cold liquid refrigerant such as calcium chloride brine. The advantage of quick freezing fish and meat is that the products are passed through the zone of crystal formation so rapidly that the resulting ice crystals are too small to be capable of materially rupturing or compressing the tissues.

Egg Storage.—Work done at Cornell over a period of years shows that the adjustment of the *pH* of the egg contents by means of CO_2 is of great practical importance in egg storage, since a relatively small amount of CO_2 in an atmosphere will markedly retard deteriorative changes.

Metals in Foods.—Ideas on the presence of small amounts of the so-called "poisonous metals" in foodstuffs are being almost completely revolutionized. An editorial review in the July number of the *Journal of Nutrition*, entitled "What Place Have Aluminum, Copper, Manganese, and Zinc in Normal Nutrition," summarizes the present attitude and gives a bibliography of the subject. The President's address at the 1928 meeting of the Association of Official Agricultural Chemists, published in the Association's *Journal* for February, 1929, touches on the same problem. The results of one of the most important studies along this line indicate the harmlessness of copper in the quantities ordinarily found in food and drinking water.

Iodine in Foods.—One of the most significant trends in agricultural chemistry during 1929 has been the increasing attention paid to the lesser chemical elements in foods. Iodine, an essential constituent of the diet of man and the higher animals, is distributed in soils, waters, and crops, in an irregular manner, as yet unexplained. The British Medical Research Council has issued a review of existing information on "Iodine in Nutrition" which summarizes the literature, tabulates the iodine content of foodstuffs and other substances, and lists several hundred references to the literature. The Food Research Laboratory of the Medical College of the State of South Carolina has published articles on the high iodine content of vegetables and feeds. Nebraska has published the results of an "iodine survey." Other states are working on similar surveys in connection with the goiter problem.

Human and Animal Nutrition.—The announcement of the demonstration that copper may play an important rôle in the hemoglobin building in certain types of nutritional anemia has added stimulus to anemia studies. This important contribution has come from Hart and his co-workers of the Agricultural Experiment Station at Madison, Wis. The value of this discovery is not confined to its application in the study of anemia in man. It now seems that large losses of suckling pigs can be averted by the prevention of nutritional anemia.

Proteins.—Two contributions in this field of research have done much to provide information on the exact nature of proteins. Linderstrom-Lang of Copenhagen has shown that casein can be resolved into several fractions, each one differing from the other in phosphorus content and in percentages of amino acids. Whether carbohydrate really forms an integral part of certain proteins has long been a debatable question. Rimington in England has obtained what seems to be conclusive evidence that serum globulin and serum albumin contain about 2 per cent of a polysaccharide which on hydrolysis yields glucoseamine and mannose. These carbohydrate products are regarded as a definite structural unit of these proteins, and seems to settle the question of carbohydrates forming an integral part of certain proteins. It has also been discovered by Bertrand and Voronca that titanium is present in appreciable amounts in many higher plants. What the significance of this may be remains to be determined.

Fats and Oils.—One of the outstanding studies on fats and oils has related to the composition of butter fat. Hilditch and Jones of the University of Liverpool have found the fatty acids from New Zealand butter fat to contain the following: butyric—3, caproic—2, caprylic—.1, capric—2, lauric—4, myristic—11, palmitic—28, stearic—9, oleic—33.4, and linolic acid 4-5 per cent. The approximate composition of the butter fat itself was found to be as follows: fully saturated mixed glycerides, 30 per cent, mixed mono-oleo disaturated glycerides—36 per cent, and mixed di-oleo-monosaturated glycerides—34 per cent. This investigation is being extended to butters made from milk of cows fed on a variety of diets including cases in which hard and soft oil-cakes are respectively added to the diet. Recent studies conducted at the University of Liverpool by Lea and probably the most accurate thus far made concerning the component glycerides of cacao butter, indicate the following composition: at least 73 per cent of mono-oleo-glycerides, not over 24.5 per cent of di-oleo-glycerides, or more than 4.0 per cent of triolein. Only 2.5 per cent of fully saturated tri-glycerides were found and these consisted of mixed palmitic-stearic acid (glycerides), in which the proportion of palmitic acid to stearic acid was approximately 2:1. The molecular ratio of saturated acids and unsaturated acids in the mixed glycerides is 1.4:1.

SOILS

Even though the hydrogen ion concentration of the soil solution may not correlate with plant growth in certain cases, enough work has been done to show that this factor is of great economic importance in certain agricultural problems. The monumental work of Olof Arrhenius on the soil reaction at which sugar beets and sugar cane give the best yields has firmly established this, and the desirability of having similar data on other crops seems unquestionable. Investigations carried on by Morgan, Anderson, and Dorsey of the Connecticut Agricultural Experiment Station show that tobacco is decidedly acid in its soil preferences, thriving best in soils classed as subacid, or having in technical terms, a *pH* value of 5.0 to 5.6. On fields with appreciably more acid than the first of these numbers indicates the crop is likely to be deficient in both quantity and quality. In fields of lower acidity than *pH* 5.6, however, injury due to black root rot may be prevalent, thus diminishing the yield seriously. Recognition of these facts helps to explain the apparently contradictory effects of liming heretofore reported.

TANNIN

Prospective Tannin Famine.—From the American chestnut tree comes more than 50 per cent of our domestic supply of tannin. The chestnut is doomed to practically complete extermination by the chestnut blight. In anticipation of this loss the Department of Agriculture is giving serious attention to the development of new sources of tannin by the introduction and growth of foreign tanniferous plants; the discovery and development of at present unknown or unused plant sources, and the possibility of converting waste products of agriculture and other industries into tanning agents.

Tests of Tanning Liquors.—The possibilities of gaining a better insight into the nature of chrome tanning liquors, and their preparation and use in tanning by application of Werner's coördinated complex chromium ions and not from that of the simple valence theory, as is still so generally done by leather chemists, are being stressed by Spiers in one of the important contributions to the literature of chrome tanning.

Bating of Skins.—Elaborate histological and chemical studies of the bating of skins have been made from which it is concluded that the most important function of the enzymic bate is probably the removal of the coagulable and previously coagulated protein of the skin. This effect as well as the removal or disruption of reticular tissue cannot be attained by purely chemical deliming agents, but require enzymic action.

INSECTICIDES

Pyrethrum.—Methods for estimating the active insecticidal principles of pyrethrum have been improved by Tattersfield, Hobson, and Gimingham in Rothamsted, and by Gnadinger and Corl in Minneapolis, making it possible to grade insect flowers by chemical analysis and of analyzing commercial preparations for legal control and conducting breeding experiments for the purpose of increasing the pyrethrin content of pyrethrum flowers. Most household insecticides designed for use against roaches, fleas, flies, mosquitoes, etc., contain pyrethrum as an important ingredient, and fly sprays are usually prepared by extracting pyrethrum flowers with kerosene.

Rotenone.—Recent work by LaForge and Smith of the U. S. Dept. of Agriculture, on the constitution of rotenone, the active principle of derris root and of finding this principle in the Peruvian fish poison known as "cube" in an amount several times that present in derris root, has resulted in widespread interest in and increased use of this insecticide.

Lead Arsenate Research.—Research in the field of insecticidal plants for the purpose of isolating and studying their insecticidal constituents has been greatly aided by a special Congressional appropriation of $25,000 to find a substitute for lead arsenate for control of the codling moth. It is believed that work on the structure of organic insecticides of plant origin may not only result in the development of methods for commercially synthesizing these materials, but will also throw valuable light on the relation between chemical constitution and insecticidal action, so that many additional organic compounds can be prepared which will have insecticidal value.

Fumigants.—Collaborative experiments between bureaus of the Department of Agriculture have shown that the addition of a small proportion of carbon dioxide to a fumigant enhances its insecticidal action and reduces the fire hazard of fumigants. This is believed to be a discovery of fundamental importance. The use of ethylene oxide, one of the fumigants developed in the coöperative work between these Bureaus, has greatly increased. This compound may replace hydrocyanic acid for the fumigation of dried fruits, nuts, and other foodstuffs, and also of narcissus bulbs.

NITROGEN FIXATION

Commercial Production.—During the past year notable advances have occurred in the commercial development in the fixation of atmospheric nitrogen. This has been accomplished without the introduction of any conspicuous new processes. While the output of synthetic nitrogen products in the United States in 1928 was equivalent to 26,000 short tons of nitrogen, the output in 1929 should be approximately 100,000 tons. Canada has expanded from a yearly production of about 140,000 tons of crude cyanamid to 255,000 tons; and a further expansion to a capacity of 355,000 tons (equivalent to about 83,000 tons of nitrogen per year) has been announced. The world production of inorganic nitrogen for 1928 was about 1,800,000 short tons, distributed as follows: Chile nitrate, 23%; Coke-oven nitrogen, 22%; Cyanamid nitrogen, 14%; and Synthetic ammonia and arc process nitrogen, 41%.

Ammonia Conversion.—Marked advancement has been made in ammonia conversion and use. Prior to 1928 no synthetic nitrogen produced in the United States entered directly into the fertilizer field but influenced this market only by displacing by-product ammonia for refrigeration and other purposes. By the end of 1928, however, domestic synthetic ammonia as such and sodium nitrate made from ammonia were going into fertilizer. The trend in the direction of concentrated complete fertilizers has continued. The domestic manufacture of synthetic sodium nitrate on a large scale is an interesting development from various standpoints, including national defense.

SPONTANEOUS IGNITION

The loss from the spontaneous ignition of agricultural products and from the spoilage of such products by heating when no fire results amounts to many millions of dollars annually, and constitutes a heavy tax on the agricultural resources of the nation. Impetus has been given to research in this field by the announcement of a new theory of spontaneous ignition by C. A. Browne, in *Bulletin* No. 141, of the Department of Agriculture. The Browne theory controverts the pyrophoric ion theory of Loupper of Zurich and the catalytic oxidation theory of Boekhout and De Vries of Hoorn. According to the Browne theory, microorganisms under favorable anaerobic conditions may produce oxidizable, unstable products concentrated in pockets within the mass. A sudden disruption of the mass by the pressure of internal gases permits an inrush of air sufficient to speed up the oxidation and consequent heating to the point of ignition. Numerous experimental data are given in the *Bulletin* to support the new theory.

ELECTROCHEMISTRY

By Colin G. Fink

Professor, Columbia University

GENERAL DEVELOPMENTS

The year 1929 has been another notable one in the American electrochemical industry. Among the notable achievements is the commercial production of lithium; the introduction of the high frequency induction furnace into steel melting and refining; the opening of the new 100,000 ton copper refinery at El Paso; the marketing of the extremely hard cutting tool material known in the trade as "carboloy," "Widia," etc.; an electric Furnace Product composed of tungsten and cobalt carbide; the development of a very sensitive liquid photo-electric cell; and last but not least, the launching of the all metal aluminum airship *ZMC2*, the first of its kind.

ELECTRIC FURNACES

Improvements in Type.—There have been marked improvements introduced in the type of equipment for the high frequency induction furnaces. The motor-generator type of equipment is taking the place of the older oscillator type. With the improved equipment the power consumption for melting silver has been reduced by more than one-third. Investigations have been extended by various interested parties in applying the high frequency induction furnace to the melting of steel. The violent stirring action is a very important factor; when deoxidizers or scavengers are added to the molten steel they are immediately distributed throughout the charge. A 5-ton furnace will deoxidize 4 charges of molten metal per hour, a record never attained by any other means heretofore.

Spectroscopic Studies of Stars.—Dr. Arthur S. King of the Mt. Wilson Observatory described the new method he devised of making spectroscopic studies of the stars with the aid of a specially constructed electric vacuum furnace in which he rendered metallic vapors luminous by temperature radiation.

Flames from electric arcs were investigated by J. Slepian of the Westinghouse Research Laboratory. The low dielectric strength was shown to be due to ionization.

Nitriding of Steel.—The electric resistance type furnace has found a new application in the nitriding process of steel. The steel parts to be treated are heated in an atmosphere of ammonia for a definite length of time. Nitrogen enters the surface layers of the metal resulting in a product superior in many respects to that which was brought about by case-hardening.

Electric Firing of Glass and Ceramics.—In the glass and ceramic industries the use of the electric furnace in place of the fuel-fired furnace is rapidly being extended. The difficulties encountered were at one time considered insurmountable.

New Phosphoric Acid Method.—The electric furnace process for phosphoric acid manufacture is replacing entirely the older sulfuric acid method.

FUSED ELECTROLYTES

Aluminum.—The production of aluminum, by far the most important metal of the fused electrolyte industry, continues to grow most astoundly. Twice as much aluminum is produced to-day as there was ten years ago, and the United States furnishes more than a third of the world's total. The phenomenal growth of the aluminum industry is to be attributed largely to the rapid development of the automotive and aircraft industries.

All-Metal Aluminum Airship.—A notable event was the launching at Detroit in the summer of 1929 of the all-metal aluminum airship *ZMC2*, the first of its kind in the world. The "bag" of this airship is filled with helium and is made of "Alclad," the new duplex aluminum sheet riveted in strips 18 inches wide by 0.0095 inch thick. The ship is 152 feet long and 52 feet in diameter, and Alclad is more resistant to corrosion than duralumin and almost as strong as the latter.

Aluminum Cars.—Street cars and railway coaches made almost entirely of aluminum have shown a marked reduction in operating costs. The familiar "tin foil" has been largely replaced by aluminum foil.

Beryllium.—Definite progress has been made in the production of beryllium on a commercial scale. The metal is decidedly lighter and much harder than aluminum. The Kemet laboratories at Cleveland have been among the pioneers in the development of the metal. As little as 3% of beryllium alloyed with copper produces a bronze that is superior to the well known 90:10 copper-tin alloy.

Lithium.—A newcomer on the market is metallic lithium, likewise made by the electrolysis of the fused salt.

The Research Corporation has conducted extensive tests with lithium, and a number of interesting alloys have been produced, notably with aluminum. Lithium is the lightest of metals, having only one-fifth the weight of aluminum or about half the weight of water.

Alloys.—Kenneth W. Ray using the fused electrolyte method studied the alloys of barium and strontium with tin, zinc, cadmium, antimony, aluminum, and other metals. Most of the alloys prepared were coarsely crystalline, and less malleable than the respective original metal.

Fluorine Gas.—Wilder D. Bancroft and Newton C. Jones of Cornell University published their results on the production of fluorine gas in the Mathers cell using as electrolyte fused potassium hydrogen fluoride. Reactions of the gas produced with various substances were then investigated. Fluorine reacts with benzene explosively.

AQUEOUS ELECTROLYTES

Copper.—Electrolytic copper experienced one of the greatest booms in the history of the metal. The demand for the metal continued to increase so that prices soared. The United States furnished over half of the copper of the world. The new Nichols refinery at El Paso was placed into commission with a capacity of 100,000 tons per annum. Foreign competition in electrolytic copper is becoming very keen. By far the major consumption of copper is in the electrical industry and next in order are the brass and automotive industries. Accordingly, the development of the copper industry goes hand in hand with these three major industries.

Electrolytic zinc is rivaling copper in its development. The output and capacity of the plants in this country are experiencing a very healthy growth. The United States production has increased by 30%. The old retort process for zinc will soon be one of historical interest only. Cheaper and better zinc is being made by the electrochemical process.

Nickel. — A consolidation was brought about by the International Nickel and Mond Nickel interests. A new electrolytic refinery for copper and nickel was opened at Port Colborne across the Canadian border. Seamless drawn nickel tubes are finding various important applications in the chemical manufacturing industry. The Western Electric Co. devised a commercial process for the co-deposition of nickel (79%) and iron (21%), producing an alloy coating of valuable magnetic properties. The nickel iron alloy "permalloy" has taken the place of electrolytic iron in the making of the well known Pupin coils. The addition of small percentages of nickel to the cadmium plate has resulted in a corrosion-proof coating for steel and brass that is much harder and more wear resistant than the pure cadmium.

Chromium.—In the plating industry chromium continues to occupy the center of the stage. Its application has become widespread and has brought about radical departures in a number of industries such as jewelry manufacture, marine fittings, automobile parts, bathroom fixtures, printing plates, drawing dies, etc. Marked improvements have been made in the art of chromium plating and new applications for the plate are introduced daily.

White lead for paints is now being produced on a very large scale by the Sperry process. The product is superior to that made by the old Dutch process.

ORGANIC ELECTROCHEMISTRY

Patents were granted to Professor H. Jamain Creighton for an electrolytic diaphragm cell for reducing sugars. A neutral sulfate bath is employed and the solution electrolyzed between a cathode of mercury and an anode of lead. Professor Alexander Lowy of the University of Pittsburgh introduced a new grid anode for oxidation reactions. With this anode he readily converted anthracene to anthraquinone. The Oneida Community company electrodeposited aluminum from amin-benzene-sulfonic acid solutions. The American Electrochemical Society at its Pittsburgh convention in September devoted an entire session to organic electrochemistry, a field which is very fertile and attracting world-wide attention.

ELECTROCHEMISTRY OF GASES

Tube Lighting.—The gas tube lighting industry is now well established in this country. For display lighting, tube lighting has become a very serious competitor of the tungsten incandescent lamp. Very artistic tube lighting effects are brought about using, besides the red neon, the green mercury and colored glasses. Helium is being used in these tubes in increasing quantities.

The photo-electric cell, with potassium, sodium, and caesium, has found an increasingly large variety of uses. Many of the standard electrical recording and measuring instruments have been redesigned, incorporating the photo-electric cell and radio tube amplifier. The new instruments have eliminated almost entirely the human error in recording. Among the interesting new applications of the photo-electric cell is the automatic smoke recorder. S. Wein has marketed a new photo-electric cell employing an aqueous electrolyte in place of the gas vapor.

POWER FOR ELECTROCHEMICAL INDUSTRIES

Boulder Dam.—The proposed Boulder Dam attracted the attention of electrochemists. The writer testified that a rate of $15 per horse power a year would attract electrochemical industries to the dam site and that it would be cheaper to transport raw materials and finished products than to transport power.

Power Developments.—The power interests of the State of New York have been further consolidated by a financial group headed by J. P. Morgan and Company. New water power developments are taking place at South Charleston, W. Va., a rapidly growing electrochemical center. An increasingly serious competitor of hydroelectric power is steam power. Large volumes of natural gas are now available in this country, the outlook being a nominal cost.

INDUSTRIAL CHEMISTRY AND CHEMICAL ENGINEERING

By Sidney D. Kirkpatrick

Editor, *Chemical and Metallurgical Engineering*

ECONOMIC ADVANCE

Forecast.—Intense activity characterized the economic and technical development of the chemical industries during 1929. While new records were being set for commercial output and industrial expansion, scientific research has been responsible for an increasing number of contributions that presage still further advances. American chemical industries face the immediate future therefore with the prospect of continued growth, not only in size, but in influence and effect on the national economy.

Commercial Research.—Just as the methods of research, *i.e.*, the determination of the facts and their honest interpretation in terms of industrial procedures have proved worth while in production, so lately has their value been recognized in the less tangible fields of marketing, finance and administration. Thus economic and commercial research has come to have an important place in chemical industry. Many of the larger companies have organized departments having for their objective the compilation and interpretation of economic information to serve as a rational basis for administrative action or policy. The effect of this work is now being seen in the development of sound marketing methods and the better balancing of the factors of production and consumption.

Trade Association Activities.—Something of the same motive and procedure, but carried on on a more impressive scale, was evidenced during 1929 in the notable extension of trade association activities. Encouraged by the coöperative attitude of the Government, manufacturers in a number of chemical industries organized close working units for the study of industrial problems and the prosecution of scientific research. Many so-called "trade practice conferences," held under the auspices of the Federal Trade Commission, afforded opportunity for the industries to adopt approved rules of business practice, to eradicate trade abuses and, in effect, to set up codes of business ethics. Among the groups in the chemical engineering field to follow this procedure were the following: lime, fertilizers, gypsum, insecticides and disinfectants, pyroxylin plastics, vegetable oils, petroleum products, paint, varnish and lacquers, glass and soap. This tendency toward industrial team work in self-regulation marks a significant advance in many of our industries.

COMMERCIAL DEVELOPMENTS

German Dye Trust.—Announcement April 26, 1929 of the formation in this country of a branch of the great German dye trust aroused a wave of hysterical protest in some quarters of the domestic chemical industry. Saner counsel, however, saw in the move only the natural consolidation of the varied and already existing American interests of the I. G. Farbenindustrie. Thus the Agfa-Ansco Corporation, the General Aniline Works, and certain German-American pharmaceutical firms were merged as the American I.G. Chemical Corporation to serve as a holding body for present and prospective development.

Mergers and Consolidations.—Following the American I.G. announcement there were several commercial developments more or less closely related to it. A new alignment of competitive forces was to be seen in several important mergers and consolidations of domestic companies in the chemical field. In the petroleum industry, officials of the Standard Oil Company of New Jersey announced that through an arrangement with the German I.G., the American company had secured world rights to certain hydrogenation processes that appear to promise revolutionary effect on fuel production.

PETROLEUM HYDROGENATION

For several years the Germans had been developing the Bergius hydrogenation process in which coal is liquefied under high pressures and temperatures to produce motor fuel. The fact had not previously been emphasized, however, that with slight variation in the operating conditions, this process could be applied to low grade fuel oils which could thus be converted quantitatively into gasoline or other desired petroleum products. Yields of 100 per cent (or slightly more on a volume basis) were possible in this method as it has been adapted and perfected by American chemical engineers. According to one of the patents the oil is agitated with hydrogen at pressures of 50-100 atmospheres at a temperature of 780-850° F. A metal oxide catalyst *e.g.*, a mixture of chromium oxide and molybdenum oxide, is suspended in the oil which is treated in pressure vessels having non-reactive alloy steel surfaces. At the end of the year commercial units each having a rated capacity of 5000 barrels per day were under construction at three American refineries. This movement adds impetus to the already vigorous development of high pressure technology in this country.

ALCOHOLS FROM PETROLEUM

Synthetic solvents from petroleum will some day form the basis for a huge American industry. Murray and Stevenson in 1929 placed a dollar value of $100,000,000 a year as the output that might be expected from the replacement or substitution from petroleum sources of acetone, butanol, ethyl alcohol, acetic acid, methanol, fusel oils, ethyl acetate and the various derivatives. At the present time plants are commercially producing isopropyl alcohol, butanol, pentanol and ethylene and propylene glycols in annual value of several millions of dollars. In May, 1929 it was announced before the Ways and Means Committee of Congress that a West Virginia chemical manufacturer had been licensed by the Government to produce synthetic ethyl alcohol from ethylene gas. The supply of this raw material is only limited by our supply of petroleum, natural gas or soft coal. In fact the various units of but one of the vapor phase cracking processes of the petroleum industry is said to produce as much as 800 tons of ethylene per day. This is, perhaps, the beginning of another great synthetic chemical industry for with the growth of lacquers, rayon and plastics there is little likelihood of lessened demand for solvents.

SPECIAL CONSTRUCTION MATERIALS

Direct production of ammonia from its elements, the manufacture of methanol from carbon dioxide and hydrogen and related developments in the field of synthetic chemistry have required greatly improved materials of construction. Severe corrosion accelerated by conditions of high temperatures and pressures, has been met by the development of a great variety of metals and alloys of which the chromium and chromium-nickel steels have had most attention. Great progress has also been made in the fabrication of these stainless steels and as their production has mounted, consequent reduction in price has opened new fields of application. Chrome-vanadium steels have come into increasing importance in the catalyst chambers of ammonia synthesis where a combination of great strength and corrosion resistance is required. Nickel-silicon steels have lately been developed for resistance to weak sulphuric acid, a most troublesome corrosive. Other new alloys of nickel, molybdenum and iron have been used satisfactorily for hydrochloric acid. Tantalum has made considerable inroads into the fields of the precious metals due to its all but universal corrosion resistance. More recently, the sister metal columbium has been produced on a commercial scale and may develop even more useful applications. Alclad, commercial aluminum protected by a surface layer of the pure metal, shows enhanced resistance and has opened up a still larger field for this metal in chemical industry, as well as in aircraft production. In fact there has been extensive as well as intensive development as the metallurgist has so effectively met the demands of the chemical engineer and brought into use stronger and more enduring metals.

EXPANSION IN RESINS

Phenol Resinoids.—Condensation products of phenols and formaldehyde have long been widely used but only within 1929 was there substantial progress made toward the use of these molded plastics to replace the wood in furniture and similar wood products. Raw material requirements for this development have placed an unusual demand on chemical industries. The output of phenol in 1929 probably exceeded 25,000,000 pounds of which less than one-third was obtained from coal tar. The balance, made synthetically from benzol, is the basis of a sizable and rapidly expanding industry. To obtain sufficient formaldehyde, the production of synthetic methanol was greatly increased by the two existing American producers during 1929 and a third plant at Niagara Falls began operations. Another source, as yet but slightly developed, is the product obtained by one of the oil companies in the pre-treatment of natural gas. Methane is oxidized directly in order that it should yield a mixture of formaldehyde and methanol.

Plastics.—In addition to the phenol resinoids, a number of comparatively new plastics became of commercial importance during 1929. Glycerol-phalic-anhydride resins found use as modifying agents in nitrocellulose lacquers. Cumaron resins also were used in paint and varnish products and in rubber and other molding compounds. Vinyl resins, made from acetylene, were demonstrated during the year, to have properties that may lead to extended application. Cellulose acetate was manufactured on a larger scale in 1929 for use in non-flammable plastics and in safety motion picture and *X*-ray films. The most important new use for cellulose nitrate is the manufacture of shatter-proof glass in which a layer of this plastic is pressed between thin sheets of glass. The product is being very widely adopted by the automobile industry.

SYNTHETIC AMMONIA AND FERTILIZERS

Production of synthetic ammonia in the United States in 1929 continued actively in seven plants. During the calendar year these plants operated at an average rate of approximately 280 tons of ammonia per day. As a consequence the 1929 production was in excess of 100,000 tons, or something more than three times that of 1928. By the first of January 1930 the daily capacity of the largest American plant (at Hopewell, Va.) had been increased to 300 tons thus raising the total for the industry to about 500 tons per day. Other expansion plans announced indicated that production in 1930 would approach 200,000 tons. During 1929 the largest American producer sold a substantial share of his product as synthetic sodium nitrate for fertilizer purposes. Much of the ammonia of this and other producers was used in the direct ammoniation of super-phosphate, this is an important technical and commercial development of the year.

Imports.—As a result of the synthetic sodium nitrate production in the United States, there was a corresponding decrease in our imports of natural Chilean nitrate, the loss during the first eight months amounting to 82,000 metric tons. Synthetic nitrogenous fertilizers imported principally from Germany likewise dropped from 65,000 to approximately 10,000 tons for the same period. Exports of ammonium sulphate produced in this country from our by-product coke ovens increased by 19 per cent or to 80,000 tons in the eight months. All of this is encouraging evidence that the United States will shortly be independent of any outside source for its nitrogen supply.

RAYON

Developments.—Outstanding movements in the synthetic fiber industry have been more economic than technical in nature although minor improvements in technology are constantly being effected and several developments of considerable importance are not far in the future.

Rayon production has increased very rapidly. The 1929 output of over 130,000,000 pounds represented an increase of 35 per cent over that of the year before and is more than 3½ times that of only five years ago. That this seemingly large output is still far from the saturation point is indicated by the fact that it amounts to only about 3 per cent of the total cotton output. At the same time it is interesting to note that the United States is now producing almost exactly one-third of the world's rayon in the 20 plants of the 14 companies now in operation in this country. Two of these companies have new acetate plants under construction that will be operating on a large scale in 1930.

Trends.—From the technical standpoint, the trend toward acetate silk is most interesting. Because of its superior wet strength and, for some purposes, better dyeing properties, four American companies will be producing acetate silk in 1930. Despite this, however, viscose production now represents about 80 per cent of the total and will probably remain so for a considerable time to come.

Brandwood Process.—An English development now attracting the attention of American producers, the Brandwood process, will conceivably be put to use here during 1930. This process makes possible all the various chemical treatments given the fiber, including desulphuring, washing, bleaching and dyeing, without rewinding between operations.

Lilienfeld Process.—Another foreign development, the Lilienfeld process, is being used on a small scale by one American firm and may find still wider use. This process is said to result in increasing a dry strength up to 7 grams per denier, or stronger than natural silk. This compares with a strength for the ordinary varieties of less than two grams per denier.

Weighting. — Another technical trend is toward the weighting of rayon fiber with tin salts as is done in the case of natural silk in order to improve "feel" and dyeing properties. Still another is the continued effort toward finer and still finer filaments.

MARKETS AND FOREIGN TRADE

Prices.—Distribution of chemicals was maintained on a fairly uniform basis throughout the year since the slump that usually accompanies the hot-weather period was but very slight in the summer of 1929. A larger percentage of production than ever before was sold on a contract basis. Sales prices, measured by the weighted index number of *Chemical & Metallurgical Engineering* showed a slightly lower average than in 1928 which is due largely to declines in the quotations given for nitrogenous materials.

Foreign Trade Expansion.—Foreign trade in chemicals showed expansion both as regards exports and imports. Statistics covering the major portion of the year indicated an increase over 1928 of 13 per cent in exports and 4 per cent in imports. The world-wide character of the distribution of American chemicals is seen in the fact that the annual purchases for each of more than 30 countries exceeds $1,000,000. Europe has always been the best customer; North and Central America the next best; the Far East is third and South America fourth. Despite the widespread interest in the export business, the proportion of exports to the total production continues astonishingly small, amounting in the last census year (1927) to but 8.1 per cent of the domestic output. An opportunity for continued growth of American chemical industry lies in this direction.

PHYSICS

By Carleton C. Murdock

Professor, Cornell University

DEVELOPMENT OF NEW WAVE MECHANICS

The results of experimental research during the year have in general brought to light no new principles. They have in most cases confirmed the theory which suggested the experiment often with interesting details. Perhaps the most significant result of the year's work is the steady development of the new wave mechanics. This has been evidenced both by the extension of the theory to cover known facts and by the experimental rarefaction of predictions of the theory.

An experiment on the capture of electrons by α-particles has given unexpected results which may give rise to new ideas concerning the atomic mechanism. As α-particles emitted from a radio-active body traverse a gas, they must encounter great numbers of electrons. Inasmuch as the α-particles are positively charged, it would be expected that they would attach to themselves negative electrons, producing helium ions. This seems to occur rarely if at all. In order to investigate this matter Davis and Barnes passed a stream of α-particles and a stream of electrons through a highly evacuated tube. The two paths were made nearly coincident and the velocity of the electrons could be controlled. The apparatus was arranged so that they could measure the fractional part of the α-particles which captured electrons.

The results show that the α-particles capture electrons only when the velocity of the electron is the same as that of the α-particles or differs from it by certain definite values. These values turn out to be the same as the orbital velocities of the electrons in the Bohr model of the helium atom.

According to the Bohr theory a captured electron is attracted into its orbit by the charge on the nucleus, gaining kinetic energy and loosing twice as much potential energy in the process. The net result is a loss of total energy equal to the orbital kinetic energy. This lost energy is radiated according to the quantum law. This theory will account for the capture by an α-particle of an electron having the same velocity as itself. However when the electron has a velocity relative to the α-particle equal to the orbital velocity it already has a kinetic energy equal to the orbital kinetic energy and the total energy to be lost by radiation will be twice as great as before. In order that the capture shall occur, the relative velocity must be very accurately the same as the orbital velocity and in that case an unexpectedly large percentage of α-particles will capture electrons. It appears from this that the electron or α-particle may effectively occupy a large region of space at certain relative velocities and a small region at others.

Repetitions of the Michelson-Morley experiment continue to be made. All agree that a shift of the interference fringes such as would be explained by the motion of the earth in its orbit about the sun on the assumption of a stationary ether does not exist. D. C. Miller has started a new series of observations with his apparatus set up a short distance from the location of the original Michelson-Morley experiment. He is obtaining results confirming those which he obtained on Mount Wilson. He obtains an effect which is considerably smaller than that expected as a result of the earth's annual motion. The effect is systematic with respect to siderial time and corresponds to a motion through a fixed ether with a velocity of about 10 kilometers per second. The effect is so far not adequately explained. It would seem that the theory of relativity is now so firmly established by its successful application to many fields, that it is not likely to be abandoned because of these experiments.

Experimental work on the diffraction of x-rays by ruled gratings is leading to interesting results. It was pointed out last year that these experiments provide a new method of computing the value of e, the charge of the electron. The values of e obtained by this method are definitely larger than the value obtained by Millikan by the oil drop method.

The expression $\frac{hc}{2\pi e^2}$ in which h is Planck's constant, and c, the velocity of light, is a dimensionless number. Eddington has given a theoretical argument to show that its value is 136. The treatment is based on the new wave mechanics and makes use of the Fermi-Dirac exclusion principle in the problem of the interaction of an electron and a proton. The commonly accepted values of c and h taken with Millikan's value of e give for this constant, *137.1*. The larger values of e obtained by the new method give values of $ch/2\pi e^2$ more nearly in agreement with Eddington's value.

The accurate determination of the value of e is a matter of considerable importance due to the many fundamental relationships with other physical constants in which it enters. Millikan's value seems to be in better general agreement with the accepted values of the other constants. The new method involves the comparison of the diffraction of x-rays by a crystal and by a ruled grating and the determination of the fundamental spacing of the crystal lattice in terms of the distance between the lines of the grating. It is pointed out in criticism of this method that it depends for its validity upon the assumption that the mean density of the crystal is the same as that of the ideal crystal lattice. The properties of crystalline matter may be roughly divided into two groups. The properties of the first may be accounted for by the structure of the crystal lattice. The properties of the second can not be accounted for in this way, and it is usual to regard the crystal as made up of a mosaic of smaller crystals whose spacing and arrangement account for these properties. Zwicky has shown that an ideal crystal would be thermodynamically unstable with the result that such a mosaic structure would occur with periodic spacing. It is suggested that this may account for the large values of electronic charge obtained by x-ray methods. If this criticism is well found it will involve a slight modification in many of the accepted values of the wave lengths of *x-ray* spectral lines. It seems quite certain that we must modify the accepted values of these x-ray wave lengths or else that of the electronic charge.

DIFFRACTION OF ELECTRONS

The subject of the diffraction of electrons has continued to attract much attention. In the original experiments of Davisson and Germer the paths of the diffracted particles did not exactly agree with those to be expected by the simple theory. The matter may be explained in general by considering that at the surface of a crystal an electron suffers refraction due to the electrical potential of the crystal. The value of the index of refraction in this case may be computed by use of the theory of wave mechanics as $\mu = \sqrt{1 + \phi / v}$ in which ϕ is the electrical potential within the diffracting crystal and v is the accelerated potential of the electron.

In experiments in which electrons are reflected from the surface of a single crystal, the value of v is of the order of 100 volts and the refractive index is appreciably different than one. Davisson and Germer find that their results indicate an effect which is analogous to the phenomena of anomalous dispersion. Experiments of this type offer a means of measuring the value of ϕ. This is likely to prove a very important application of the new theory as the value of the potential within metallic conductors is an important factor which enters into many physical problems.

In experiments in which electrons are transmitted through a fine crystalline powder as performed by G. P. Thomson, the refraction is not important since the accelerating voltage is so large that μ does not differ appreciably from one. Indeed the value of v must be of the order of 10,000 volts in order to obtain transmission of the diffracted electrons by the layer of crystals. A striking feature of these experiments is the effect of a transverse magnetic field. Such a field displaces the diffraction pattern bodily by the amount to be expected if the diffracted electrons have their original velocity. It thus appears that the electrons have lost no velocity in the process of diffraction. Some of the transmitted electrons have lost velocity but they do not form a diffraction pattern. This latter effect is more marked at low accelerating potentials.

EXPERIMENTATION

The phenomena of the spontaneous emission of α-particles by radio-active substances has been hard to explain in terms of the classical theory. It would seem that the emission is not caused by external action since no change in physical conditions effect the rate of emission. The atom seems to be perfectly stable for a very long period and then suddenly disintegrates emitting an α-particle. The stability would indicate that the α-particles to escape from the nucleus must pass through a region of high potential energy surrounding the nucleus. The problem has been recently studied from the point of view of wave mechanics by Gamon and independently by Gurney and Condon with interesting results. Whereas by classical mechanics the passage of the α-particle through the high potential region was not possible, by wave mechanics it is merely improbable. The treatment of the problem leads to the law of radio-active decay and explains the Geiger-Nuttall relation between the rate of disintegration and the velocity of the α-particle. It turns out that the law of force action between an α-particle and the nucleus is substantially the same for all radioactive substances. This result is the more striking when one remembers that the rates of decay of the radioactive substances concerned lie in a range the ratio of which is 10^{22}.

One of the earlier predictions of the wave mechanics was that there should be two species of hydrogen molecule. In one the wave terms representing the atoms are symmetrical and in the other anti-symmetrical. According to the theory such physical properties as thermal conductivity and specific heat should be different for the two species. The separation of two species of hydrogen by Bonhoeffer has given a convincing confirmation to the wave mechanics theory especially with regard to its value in explaining the molecular properties of matter.

Sommerfeld has applied the wave mechanics to the problem of the production of the continuous x-ray spectrum. He obtains results in good agreement with experiments recently performed by Kulenkampff and others under conditions such that the electron was completely stopped by impact with a single atom.

COGNATE SOCIETIES

American Chemical Society, Mills Bldg., Washington, D. C.
American Electrochemical Society, Columbia University, N. Y. C.
American Leather Chemists' Assn., 143 W. 20th St., N. Y. C.
American Microscopical Society, University of Ill., Urbana, Ill.
American Physical Society, Columbia University, N. Y. C.
American Society of Biological Chemists, Columbia University, N. Y. C.
Copper and Brass Research Assn., 25 Broadway, N. Y. C.
National Research Council, 29 W. 39th St., N. Y. C.
Society of Chemical Industry, Pratt Institute, Brooklyn, N. Y.
Synthetic Organic Chemical Manufacturers Assn., 1 Madison Ave., N. Y. C.

DIVISION XXII

BIOLOGICAL SCIENCES

ORGANIC EVOLUTION

By G. Kingsley Noble

Curator of Herpetology and Experimental Biology, The American Museum of Natural History

EXPOSITION OF MUTATION

Palæontological Discovery.—Recent palæontological discoveries have done much to make our picture of the rise and evolution of vertebrate animals complete. For instance, the recent discoveries of D. M. S. Watson have shown us in great detail how the fish skeleton was made over into that of the first land vertebrate during the lower Carboniferous period. Again we know that mammals, including ourselves, sprung as a group not from just reptiles during the Triassic times, but from a particular group of reptiles, the cynodonts, living in South Africa. This filling in the detail of vertebrate evolution is more than of mere academic interest. It helps us explain the peculiarities of our own organization. Why, for example, should the sound waves be transmitted to our inner ears by three bones instead of one? The answer is to be found in the evolution of these cynodonts which made over the bones at the posterior end of the jaw into ear ossicles, at the same time forming a new joint between lower jaw and skull on which to hang their jaws.

Hereditary Determiners. — The record of life on the earth is of great interest, but why should anything evolve? The answer is to be found in the nature of the hereditary mechanism. The eggs of practically all animals are very much larger than the sperms of the same species, but yet we know that both sexes usually contribute equally to the inheritance of the progeny. The reason, as shown conclusively by geneticists and cytologists, lies in the fact that the hereditary determiners are, with one or two exceptions, in the chromosomes. The latter before fertilization, form the head of the sperm and the most conspicuous part of the egg nucleus. When the determiners on the chromosomes change or mutate, an animal with one or more structures different from the parents develops from the egg. All of our many breeds of dogs have arisen by mutation from a domesticated wolf, and all the kinds of pigeons by mutation from the rock pigeon of Europe. But what makes the determiners or genes mutate?

Man-made Evolution.—Perhaps the most significant biological discovery of the last few years is the demonstration that the determiners may be made to mutate by artificial methods. Various biologists, notably Müller and his associates, working with *X*-ray and radium, and very recently Goldschmidt using heat, have shown that man can produce mutation, can speed up evolution in animals and plants at will. Goldschmidt found that exposing the eggs of fruit flies to temperatures of 37° C for 10 to 12 hours produced many kinds of new types of flies. I have been many places in the tropics where a temperature of 37° C has been maintained for nearly that length of time. High temperatures may be one of the factors accelerating speciation in the tropics. Very recently Babcock and Collins have showed that fruit flies placed near radioactive rocks in nature doubled their normal rate of mutation. The explorer going into the field to-day may make to considerable advantage a determination of the various physical forces in environment speeding up the rate of evolution.

NATURAL SELECTION

Structural Variations.—Do these recent discoveries alter the current views of evolutionary processes? Mutations were known to Darwin though he was ignorant of their physical basis. Darwin's great contribution to biology was his principle of natural selection. All the individuals of any one species are not exactly alike. Those which have the most useful characters, Darwin suggested, will survive and the other line die out. This would be true whether or not we speed up the rate at which the variations, good, bad and indifferent, are produced. There is no reason why we should change our views on that score. Recent studies, however, in the laboratory and field have modified our conception of natural selection in one respect. The chromosomes of the fertilized egg lie in pairs, one of each pair derived from the father and the mother. Most mutations occur in only one of each pair of genes in the chromosomes, and in many cases may not show itself as a structural change in the first generation due to the dominance of the other member of the pair of genes. Most wild species carry many concealed mutations, or at least the individuals are hybrid for genes in many pairs of chromosomes and will not breed true. If individuals are isolated from the remainder of the species and allowed to inbreed, the characters will soon appear and become fixed. Isolation speeds up evolution and the many characters which rise by mutation in an isolated group are not subjected to the sieve of natural selection.

Breeding Isolation. — There are many kinds of isolations. In Eastern United States the leopard frog breeds much earlier than the green frog and hence is in no danger of crossing. Similarly, the American toad breeds earlier than Fowler's toad which it resembles closely. Species not only isolate themselves by breeding at different times but in different places. Perhaps the most beautiful New Jersey frog, the Anderson tree frog, is found only in the pine barrens of the state. Further, these habitat or season preferences may arise as a mutation as Banta and Wood have shown us in the case of certain crustacea. An isolated community will tend to collect mutations which will not have to win their way by competition. The genetic analysis is fully confirmed by field observation. Many characters appear in isolated stocks which have no functional significance. Further, the characters appear before any need for their use has arisen. The adhesive disks of tree frogs, for example, developed before the frogs become arboreal.

ORGANIC DEVELOPMENT

Cellular Growth.—We know that the egg divides and distributes the chromosomes equally to its daughter cells. In each cell of an animal's body there is the same number and apparently kind of chromosomes as in the fertilized egg before development. What makes one part of the embyro grow into head and another part tail, or the head develop into that of a pig instead of a man? Here we must turn to the recent important advances in the field of developmental mechanics and examine the egg of a frog or salamander first as this lends itself to experiment better than the egg of a mammal enclosed in the parent's body. The fertilized egg of frog or salamander divides into many cells and finally the upper part of the egg grows over the lower until it leaves only a small portion of the yolk protruding. If we remove by the method of Spemann and his associates a small part of the downward growing lip of the developing egg and transplant it into the side of another egg it will organize the side of the egg to form a second embryo. The nature of this influence,—whether chemical or physical—is not known. A little later the brain sends out two cups destined to form the retinas of the eyes, and skin of the embryo overlying them is molded to form a lens on each side. If the cup is transplanted into another part of the embryo it will form a lens there. What kind of a chemical substance, if any, the cup secretes to produce this effect is not known. Growing tissues may influence enormously less differentiated tissues and this holds true throughout most of development. Helff has recently shown that the ear cartilage of the developing frog would manufacture a tympanum out of any skin transplanted over it. During early as well as later stages of development the growing parts influence one another. The genes in the chromosomes merely give a certain specificity to the reaction. There is no one gene for eye and another for leg. The chromosome set in each cell acts as a unit.

BEHAVIORISM

Behavior Mechanism.—Any animal seems, however, much more than a sack of chemicals, no matter into how many compartments or cells the sack may be divided. An animal moves and acts, frequently intelligently. Purposeful behavior seems to be something of a different category. The recent investigations of Coghill and others have done much to elucidate the mechanism of behavior. Let us take a very simple instinct such as the swimming behavior of a tadpole and see what goes on inside of the animal. During the early stages of development a touch on one side of the body will elicit a turning of the head away from the source of stimulation. The nerves are so arranged at this stage that all sensory stimulations are carried forward and shunted across the posterior part of the tadpole's brain to the motor nerves of the opposite side. The latter cause the muscles on that side to contract and turn the head. A little later in development the motor nerves on the side of stimulation have grown back and the stimulation of bending the head in one direction causes motor impulses to pass down the side of stimulation a little later than on the opposite side. The growth of nerves backward during development to form hook-ups with new muscle segments and nerves, changes a head-bending tadpole into a swimming one. Experience did not teach the tadpole how to swim. Nerves merely grew like sprouts from so many seeds, and the pattern of growth was the basis for behavior.

GLANDULAR CONTROL

Effect of Environment.—In general, animals are not affected by their environment. Everything is determined by the chromosome and the processes they initiate. The environment can merely effect the expression of these processes. This may be true but experimental biology has recently taught us that the expression may be changed as to produce almost a new type of animal. For example, the giraffe's spots are laid down only in well vasculated places in the skin. Schultz has recently shown that in a certain race of rabbits dark stripes could be produced by stimulating new hair to grow rapidly in certain regions. Zavadovsky changed the plumage of fowls from red to almost black by feeding with small doses of thyroid. The thyroid gland regulates the rate at which we live—controls metabolism. Tadpoles deprived of their thyroid glands can never metamorphose into frogs. Sheep without their thyroids remain stunted, and children become cretins.

Gland Secretions.—Other glands of internal secretion have an equally important control over what we are. The growth of our bodies, especially the long bones, is controlled by a secretion from the anterior lobe of the pituitary, a gland at the base of the brain. Dinosaurs owed their large size to their enlarged pituitaries, but these in turn were produced by certain peculiarities of development conditioned in the first place by the equipment of genes. The tremendous strides being made in the study of the glands of internal secretion is placing us in a position to make up by glandular treatment many deficiencies given to animals or ourselves by heredity. Already giant rats and salamanders have been produced by treatment with pituitary substance and there is every reason to believe that our own stature could be regulated by similar methods.

Sex Determination.—The effect of a gene may, therefore, be altered by the environment. Even such a fundamental character as sex may be changed. Sex, like other characters, is determined by the chromosomes. Nevertheless, there are several records of hens which after living a useful life rearing several broods of their own chicks, have changed into roosters. Recently Witschi has shown that the sex of frogs could be changed from the female to male direction. Increased temperature favored the development of testicular tissue in the central part of the immature gland. Witschi suggests that there are two substances, one male- and the other female-producing, elaborated in the different parts of the gland and influenced in different ways by temperature. Such a male- or a female-producing substance has not been isolated. Still, the effect of transplanting a testis from a male into a female may be very marked even in the adults of some animals. In the dusky salamander, for instance, such an operation causes the short bicuspid teeth to be replaced by the elongated dagger teeth characteristic of the breeding male.

The glands of internal secretion are very closely linked with one another. We have mentioned that the anterior lobe of the pituitary secreted a hormone controlling the growth of the long bones. From the recent investigations of Smith and Engle we know that it secretes another hormone which regulates the growth of mammalian ovary. Bellerby has shown that its secretion controls the release of egg from the follicle. The sexual cycle of mammals, both the growth of the eggs and their release from their follicles, is thus under the control of a small part of a small gland lying at the base of the brain. But what we may ask, controls the gland in turn? It has been known for a long time that many birds may have the eggs removed from their nests and still continue to lay. It would thus seem that release of the hormone from the pituitary was under nervous control. This suggests that one of the reasons for the elaborate courtship of many birds may be merely a way of stimulating the anterior lobe of their pituitaries to secrete, this in turn to start the process of ovulation and to release the instincts of nest building.

In brief, the glands of internal secretion not only modify structures as they develop, but they make these structures function at definite times. If we are not satisfied with the change in our genes given us by heredity we are not bankrupt. By the use of endocrine products we may modify this inheritance to suit particular purposes. The only unfortunate feature of this cheerful outlook is that there is at present no known way of handing on the improvements which have been made in an animal's body to the next generation.

VERTEBRATE ZOOLOGY

By James E. Kindred

Associate Professor, University of Virginia

MORPHOLOGY

Nervous System. — The physical properties of nerve fibers and their sheaths have been studied by the microdissection method by G. St. de Renyi. He states that Henle's sheath contains elastic fibrils and is adherent to the nerve fiber; the substance of the axis cylinder is plastic and elastic; the neurilemma and myelin sheaths are non-elastic; and normal living axis cylinders do not contain neurofibrils, nor are they enclosed in an axolemma. According to S. L. Clark, the arteries of the medulla and spinal cord in cat and dog are innervated by unmyelinated nerve fibers with a neurilemma. No nerve fibers were observed on veins of the central nervous system. J. C. Hinsey has traced nerve endings in blood vessels of skeletal muscle and finds that thoracolumbar sympathetic fibers are distributed to blood vessels possessing smooth muscle. Afferent fibers were observed in the adventitia of small arteries and veins, arterioles and venules, but not on capillaries. S. L. Clark observed similar distribution of nerve endings in blood vessels of the choroid plexus of the fourth ventricle. The presence of a fold, the utriculo-endolymphatic valve (originally described by Bast, 1928), guarding the opening between the utriculus and the endolymphatic duct in the human internal ear in a two-year-old child and an adult has been confirmed by J. G. Wilson and B. J. Anson.

Digestive Organs.—Ferguson reports that in regeneration of gastric mucosa of dogs following extensive injury, foveolar cells produce mucous chief cells which, by further differentiation may transform either into parietal or serous chief cells.

Blood.—According to A. B. Dawson and C. Spark, the segregation apparatus of thrombocytes and leucocytes of Necturus reacts similarly to neutral red and to prolonged exposure to osmic acid. Interesting conditions accompanying degeneration of erythrocytes of a salamander, Triturus viridescens, infected with blood parasites are presented in detail by R. F. Nigrelli. From analysis of blood counts of white rats fed thyroid gland, as compared with normal rats, A. E. Adams and F. Shevket conclude that thyroid feeding probably causes stimulation of erythrocytogenic and leucocytogenic centers of bone marrow. H. E. Jordan and C. C. Speidel report investigations of blood cell formation in the horned toad, Phrynosoma solare. The unitarian conception of blood cell origin is argued, with the lymphocyte of the spleen as the functional hemoblast ancestral to all other types of blood cells, and itself possibly arising from the reticulum cell. Jordan gives a critique of the data available for distinguishing between plasma cells and erythroblasts. The shape and specificity of the nucleus of the megakaryocyte of bone-marrow has been studied by D. M. Kaufman. His reconstructions of megakaryocytes show that intravascular fragments are frequently continuous with extravascular megakaryocytes.

Urogenital System.—R. D. Bensley demonstrates a continuous investment of pericytes on the vasa efferentia of the mammalian kidney. It is suggested that these cells are contractile and an efficient means for raising the pressure in the glomerular capillaries. O. F. Kampmeier from examination of the ovaries of dogs concludes that the degeneration products of atretic follicles simulate cleavage stages of fertilized ova and that claimants of parthenogenesis in mammalian ovaries have been misled by these pseudo-parthenogenetic simulacra. Histologic changes in lutein cysts induced in ovaries by daily transplants of fresh anterior hypophysis in rats have been followed by E. T. Engle and P. E. Smith. R. R. Humphrey has discovered that normally the testis of larval male Amblystomæ (salamanders) has a peripheral zone in which are present germ cells with ovarian potentialities.

Endocrine glands.—According to H. E. Jordan and J. B. Looper, the concentric corpuscles of the thymus of the box turtle are predominantly unicellular and develop from entodermal stroma. Degeneration and regeneration of the parathyroid gland parenchyma of the frog are described by R. A. Waggener. After examination of hypophyses from 200 human beings, A. T. Rasmussen states that in only two cases did he find ciliated cells.

CYTOLOGY

Chromosomes.—The history of the chromosomal vesicles in the egg of Cryptobranchus allegheniensis (hellbender) is described by B. G. Smith. During the telophase of mitosis each chromosome becomes enclosed in an individual sac which, together with its contents, is called a chromosomal vesicle; the membrane of the sac is of cytoplasmic origin, but is formed under the influence of the chromosome and contains a droplet of karyolymph. W. E. Hoy and W. C. George report that there are eleven pairs of chromosomes in the somatic cells of the opossum. The sex-chromosomes are of the X-X type in females and X-Y in males.

Cytoplasm.—According to R. T. Young, fixing fluids which contain acetic acid in 5% strength and in combination with chrome salts do not usually dissolve mitochondria. H. L. Weatherford studied the cytoplasmic constituents (Golgi apparatus, trophospongium, canaliculi, and mitochondria) in mammary glands of albino rats. He found a topographical relationship between the Golgi apparatus and the trophospongium and other canaliculi. Experimental procedures designed to speed up and slow activity in the cells of the mesonephric tubules of Necturus (salamander) demonstrate, according to L. F. Curry, that variations of the same magnitude in form, position, quantity and interrelationships of granules, globules, chondriosomes and Golgi apparatus, occur in normal untreated animals as in those treated experimentally. W. P. Covell watched the zymogen granules of the cells of the pancreas of living white mice under high magnifications in preparations maintaining intact circulation of blood and observed that granules and clear vacuoles passed from the cells into the acinar lumina. The distribution of terminal bars in epithelial tissue of different organs has been investigated by G. E. Wilson. The conception that basal bodies, from which cilia sprout in ciliated cells, are derived from centrosomal divisions receives confirmation from the observations of L. Walter of ciliogenesis in a dilated hydatid of Morgagni. He states that the diplosome sinks from the surface of an unciliated cell to the deeper part and there divides to form an aggregation of granules which migrate to the free surface of the cell and sprout cilia.

EMBRYOLOGY

Embryos and Fetal Membranes.—A young human embryo of 3 mm. in length is described in detail by G. W. Corner. This is of interest, because it is one of the youngest human embryos yet recorded. From a morphological analysis of the foot anomalies occurring in descendants of *x*-rayed mice, A. M. Bean suggests that these result from developmental arrest of musculature and bone occasioned by different degrees of failure of blood and nerve supply. Free martin conditions are described by W. Hughes for swine, although the inhibition of development is not so complete as in cattle.

Histogenesis and Morphogenesis.—The earliest stages in the development of the lymphatic nodules in lymph nodes of human fetuses are described by W. Ehrich in an attempt to clear up the significance of the nodules of Flemming which are usually regarded as centers of small lymphocyte production. He finds only solid and pseudosecondary nodules in fetal life; Flemming's nodules develop later. The details of the development of the medial retropharyngeal lymphatic node of the calf from an independent mesenchymal origin are described by J. E. Rothermel. From a study of the early development of the pharyngeal pouches of the white rat, W. M. Rogers states that no fourth pouch is present, hence that part of the parathyroid contributed by this pouch in other mammalian embryos is lacking. The palatine tonsil is also lacking. The development of the thyroid gland of the chick has been followed by W. Bradway from its first appearance to the time colloid appears in its follicles. The rate and degree of growth of the mucosa of the human stomach from fetal life onward has been studied by G. H. Scott, who concludes that it increases most rapidly in the first three postnatal months.

EXPERIMENTAL

Tissue Transplantation.—R. K. Burns, Jr. and L. M. Burns have found that neither member of a pair of heteroplastic parabiotic twins (made by joining a larval Amblystoma tigrinum to a larval A. punctatum) is affected as to its rate of growth or differentiation by the conjoined twin provided the diet is constant. According to H. L. Wieman and T. C. Nussman the optic vesicle and part of the nasal placode of Amblystoma embryos when transplanted to the site of an excised limb bud will give rise to an eye and nasal sac, respectively, but no central nervous connection is established. The growth relationships of various transplanted cranial placodes in Amblystoma are described by L. S. Stone, particularly with regard to the rôle they play in the development of the lateral line sense organs. S. R. Detwiler has found that mesoderm from the site of future limb buds in Amblystoma when transplanted in an inverted position will give rise to limbs with reversed symmetry, thus demonstrating that the polarity of the limb is determined before it appears. Detwiler and R. L. Carpenter have discovered that the fifth spinal nerve is the nerve concerned in coördinating movements between the normal limb of one side and heterotopic transplanted limb of the opposite side of the body in Amblystoma. F. H. Swett reports that the cartilaginous shoulder girdle of Amblystoma larvæ undergoes reduction in size after transplantation. According to O. M. Helff, the larval tongue of the frog tadpole when transplanted to the skin of the back will undergo growth and differentiation at metamorphosis, thus demonstrating that differentiation is not determined by its normal buccal position, but by the hormonal content of its blood supply. V. F. Lindeman has found that tadpole skin when transplanted to foreign parts of the body will develop the pigment pattern and physiologic characteristics of that part of the body from which it was taken.

Circulatory Organs.—H. B. Kellog demonstrates experimentally that the blood entering the right atrium of the heart from the superior and inferior venæ cavæ in pig and dog fetuses is mixed in this chamber, hence all the blood leaving the fetal heart is of the same degree of purity. C. M. Goss shows that removal of the primitive blood island of Amblystoma embryos results in absence of blood cells from the circulatory organs; animals may live for 30 days in this condition.

Reproductive System. — Gonads transplanted into body wall from one Amblystoma larva to another are not affected as to their sex differentiation by the sex hormone of the host, but when transplanted to the normal position in the body cavity, the ovary present, when the gonads are of the opposite sex, will undergo a partial sex-reversal (R. R. Humphrey). E. Witschi has produced sex-reversal experimentally in female frog tadpoles (Rana sylvatica) by application of higher degree of temperature than is normal. B. H. Willier and E. C. Yuh demonstrate in the chick that chorio-allantoic grafts of gonads do not cause a typical sex differentiation in host embryos. New data on the problem of ovarian regeneration in rats are reported by F. M. Heys. Comparative data on regeneration of ovaries following apparently complete ovariectomy indicate that regeneration occurs only in adult rats in which the possibility of incomplete removal is enhanced by the diffuse ramifications of the ovary in an enveloping fat body; in rats under forty days of age in which the ovary is free and not embedded in fat, no regeneration followed ovariectomy. C. R. Moore demonstrates by his 'sperm motility' tests that the hormone produced by a normal testis effects motility for a short length of time; the hormone from a small cryptorchid testis is as powerful as from two normal mature testes; whereas non-living testis transplants have a negligible effect. The powers of motility of the sperm in the epididymides of guinea-pigs and rats have been found by R. E. Heller to be slowed up considerably if the epididymis is confined to the abdomen. According to W. C. Young artificial insemination in guinea-pigs with sperms taken from epididymides which have been subjected to high temperatures (up to 45° C.) are no less potent than those from normal epididymides.

Endocrine Glands.—C. C. Speidel has observed retardation in pulsation rate of posterior lymph hearts in thyroid treated tadpoles. He reports also interesting resorptive changes in regenerating tadpole tails following thyroid adminstration. According to W. R. Ingram, hypophysectomized and thyroidectomized axolotls previously considered incapable of metamorphosing except under treatment by glandular replacement therapy or with ogranic iodine compounds, have metamorphosed following large amounts of inorganic iodine administered subcutaneously or intraperitoneally. G. E. Johnson and E. D. Sayles find that daily injections of bovine pituitary extract in both male and female rats from the 15th to the 150th day of life, result in acceleration in growth over that of saline-injected litter mate controls of the same sex. The hormonic relation between thyroid gland and hypophysis in tadpoles of Rana clamitans, which remain in the larval state for over a year following hatching, has been investigated by W. R. Ingram. He finds that implantation of anterior lobe substance from adult frogs induces a rapid metamorphosis.

Nervous System.—According to O. Larsell reduction in size of the optic lobe of metamorphosed frog larvæ follows excision of the eye after retinal function is established. S. C. Detwiler states that complete removal of right 6th, 7th, and 8th somites of Amblystoma embryos in early stages of development has no effect upon proliferation of cells in the spinal cord on the demuscularized side. Also motor nerve roots grow out from these regions, a condition contrary to a current muscle-stimulus conception of nerve growth. By experimental transection of the brain stem in cats, J. C. Hinsey and S. W. Ranson demonstrate that the tegmental portion of the hypothalamus must be intact in order for spontaneous walking to occur.

INVERTEBRATE ZOOLOGY

By J. A. Dawson

Assistant Professor, College of the City of New York

PROTOZOA

Life Cycle.—In a continuation of statistical studies on the division rate of ciliates O. W. Richards (*Biol. Bull.*, Vol. 56, No. 4) presents data showing a correlation between the amount of sunlight and the seasonal rhythms in long-continued cultures of *Paramecium, Blepharisma* and *Histrio.* The controversial subject of the effect of quantity of culture medium on the division rate of protozoa is attacked by Walburga A. Peterson (*Physiol. Zool.*, Vol. 2, No. 2), who finds that there is a greater division rate in *Paramecium* when placed in smaller volumes of medium as compared with larger volumes; and that, in general, the greater the number of animals in any given volume the greater is their division rate. The author is thus in essential agreement with Robertson. A diametrically opposite conclusion is reached by Theodore L. Jahn (*Biol. Bull.*, 57, 2) who finds in mass cultures of *Euglena* no trace of allelocatalytic effect.

Physiology.—In a paper with much experimental data, J. H. Weatherby (*Physiol. Zool.*, Vol. 2, No. 3) shows that the chief nitrogenous excretion in *Paramecium* and *Spirostomum* is urea while in *Didinium* the excretion is ammonia. He describes a method for the quantitative estimation of urea in the contractile vacuoles of these protozoa and concludes that the contractile vacuole is not primarily an organelle for excretion of nitrogenous waste materials, but that, particularly in *Paramecium* and *Spirostomum*, part of all the soluble substances contained within the body pass to the exterior by dialysis. After studying the effect of ammonium on ameba protoplasm both by injection and immersion experiments, Floyd J. Brinley (*Biol. Bull.*, Vol. 56, No. 5) comes to the conclusion that the effects of the ammonium salts are chiefly due to the cations but may be modified by the anions. A new cell membrane is formed when an ameba is torn in $^{n}/_{100}$ solutions of the salts and he claims that the toxic action of some ammonium salts is due to action on the plasma membrane and not on the internal protoplasm. J. A. Dawson (*Proc. Soc. Exp. Biol. & Med.*, Vol. 26, p. 335) shows that the ciliate *Blepharisma* under appropriate conditions is cannibalistic and that there is evidence for believing the pigment of this animal is a natural indicator. This is later proved by R. Emerson (*Jour. Gen. Physiol.*, Vol. 13, No. 2) who extracted the pigment after macerating living animals in fine quarts sand with methyl alcohol. The characteristing pink color is most intense on the acid side of neutrality and becomes colorless at a *pH* slightly higher than neutrality. The same author (*Jour. Gen. Physiol.*, Vol. 13, No. 2) shows that this pigment absorbs light in much the same manner as previously shown by Lankester for stentorin. An interesting fact in connection with the pigment of *Blepharisma* is shown by J. Ernest Nadler (*Biol. Bull.*, Vol. 56, No. 5) who finds that it is contained in the pellicle. Solutions of strychnine sulphate cause the protozoan to withdraw itself completely from the pellicle which is found to be nonessential for life, divisions or motion and which may easily be regenerated.

Morphology and Cytology.—D. H. Wenrich (*Biol. Bull.*, Vol. 56, No. 6) describes the morphology of *Actinobolus vorax* and states that its chief food is the rotifer, *Anurea*. He confirms previous writers as to the paralyzing principle in the "toxicysts" of this animal. Working with the flagellate *Peranema trichophorum*, R. G. Hall demonstrates two types of cytoplasmic inclusions, mitochondria which are rod-like arranged in spiral rows and small spherical osmophilic inclusions scattered in their distribution.

Evolution, Variation and Heredity.—In a study of the factors regulating body size and fission in Colpoda, E. F. Adolph (*Jour. Exp. Zool.*, Vol. 53, No. 2) concludes that longer individual lives are correlated slightly with larger body size and that parent size and offspring size are highly correlated. Temperature, change of temperature, quality and quantity of food and oxygen tension are effective in modifying mean sizes and fission rates. Age at time of division and other factors correlated with size decide when growth of individuals should cease and reproduction occur. An experimental attempt to modify the reproductive activity of *Plasmodium cathemerium* by subjecting infected canaries to days and nights of lengths varying from 6 to 20 hours is made by George H. Boyd (*Jour. Exp. Zool.*, Vol. 54, No. 1). The author finds that such treatment alters the periodicity of reproduction and that such alteration is most pronounced when the experimental day and night last 14 hours each. In investigating the effect of ultra-violet rays on *Uroleptus*, Gary N. Calkins (*Biol. Bull.*, Vol. 57, No. 2) finds that a reduction in size and a change in the shape of the organism is brought about. Various other minor changes are also induced. *Uroleptus* being much more susceptible to influence of ultra-violet radiation than other types of free-living protozoa. Using the same treatment, Mary Stuart MacDougall (*Jour. Exp., Zool.*, Vol. 54, No. 1) working with Chilodon reports the occurrence of true mutants which retained the mutant characters through conjugation and encystment and also modifications which bred true by fission but which died before conjugating as well as temporary variations and abnormalities.

METAZOA

Morphology, Development and Behavior.—David D. Whitney (*Physiol. Zool.*, Vol. 2, No. 2) reports that in crowded cultures of the rotifer, *Hydatina*, where the rate of metabolism is apparently lowered, production of males is markedly reduced. In contrast to the results just quoted Arthur M. Banta and L. A. Brown (*Physiol. Zool.*, Vol. 2, No. 1) find that, in *Cladocera* cultures, crowding of females regularly brings about the production of males whereas in uncrowded cultures only females are produced. Not only *Cladocera* of the same species but other species and even unrelated aquatic animals may be used in producing the crowded condition. The authors hold that male production is associated with excretory products in the crowded cultures. In a second paper by the same writers (*Physiol. Zool.*, Vol. 2, No. 1) the unstable nature of the excretory products is stressed. William L. Dolley, Jr., and J. L. Wierda (*Jour. Exp. Zool.*, Vol. 53, No. 2), in studying the relative sensitivity to light of different parts of the compound eye in *Eristalis tenax*, report that the ommatidia located at the center of the compound eye are 55 times as sensitive to light as those at the anterior end. W. A. Kepner and J. W. Nuttycombe (*Biol. Bull.*, Vol. 57, No. 2) show that *Microstomum* continues to appropriate and use the nematocysts of *Hydra* even after the elapse of 26 asexual generations during which no opportunity to feed upon *Hydra* occurred. In a study of the excretory system of *Geonemertes*, Wesley R. Coe (*Biol. Bull.*, Vol. 56, No. 4) finds that this system possesses numerous clusters of from 6 to 10 nephridia and that each cluster of nephridia communicates with the exterior by its own efferent duct. In an extensive paper, Dontcho Kostoff and James Kendall (*Biol. Bull.*, Vol. 56, No. 6) show that the structure and development of certain *Cynipid* galls depends on such factors as plant specificity, quantity of sap in the tissue when the gall starts, the organ or tissue in which it originates, the specificity of the insect, the quantity of its foreign substances, disintegration products resulting from mechanical injuries and the presence and activity of unicellular organisms. An interesting study of the action of the spiracles in certain grasshoppers is made by James M. MacArthur (*Jour. Exp. Zool.*, Vol. 53, No. 1) who finds that the usual course of the air is inward through the first four spiracles and outward through the last seven. The action of spiracular valves is explained and the ability of the grasshopper to reverse at times the direction of the air currents is elaborated. In a re-examination of the reversal of ciliary beat in the ciliated grooves and lips of the sea-anemone, *Metridium marginatum*, G. H. Parker and Alison P. Marks (*Jour. Exp. Zool.*, Vol. 52, No. 1) find that, although the cilia of the ridges normally beat outward and those of the grooves inward, both sets may be made to reverse their beat.

Cytology.—In a continuation of extensive studies on the nature of central bodies in *Echinarachnius* eggs, H. J. Fry (*Biol. Bull.*, Vol. 56, No. 2) concludes that the so-called central bodies are coagulation artifacts and makes the important suggestion that this finding may equally well apply to many other types of cells. In a second paper, Dr. Fry (*Biol. Bull.*, Vol. 57, No. 3) shows that central bodies are present only when astral rays are seen. In a third paper published with Matthew Jacobs and Harry M. Lieb (*Biol. Bull.*, Vol. 57, No. 3), Dr. Fry and his co-workers report that with certain fixations rays and central bodies are present only at the higher temperatures and both are absent at lower fixation temperatures. As in all previous studies by Dr. Fry there is no evidence of the presence of centrioles but these may be simulated occasionally by cytoplasmic granules. The chromosome numbers for *Moina* have been worked out by Ezra Allen and A. M. Banta (*Jour. Morph. and Physiol.*, Vol. 48, No. 1) who find that in the female body the number is 22. The number present in the male is not stated but it is not haploid as the number is greater than 11. No correlation is found between environmental sex control and a sex-chromosome mechanism.

Physiology.—Edith Rogers (*Physiol. Zool.*, Vol. 2) gives the average rate of oxygen consumption for *Melanoplus* nymphs and finds that the value of the temperature characteristic (μ) is in accord with that found by other workers. In a similar study on the oyster, H. Federighi (*Biol. Bull.*, Vol. 56, No. 5) reports values for μ of 16,600 and 13,600 calories which are similar to those found by other workers with molluscs. Contrary to widespread belief that mosquitoes require a meal of blood before ovulation and oviposition, Clay G. Huff (*Biol. Bull.*, Vol. 56, No. 5) offers evidence to show that these phenomena may take place in mosquitoes fed on a number of substances other than blood or blood derivatives. Observations on the endodermal glands of *Pelmatohydra* by Carl H. McConnell (*Biol. Bull.*, Vol. 56, No. 5) indicate that the peristomal glands secrete substances which are essential in preliminary digestive phases. H. Federighi (*Biol. Bull.*, Vol. 56, No. 5) presents evidence to show that *Urosalpinx* is positively rheotropic and that its rate of turning and creeping is a function of the current velocity of the water. The organs for stimulation are probably located in the parietal musculature of the foot. In studying the influence of temperature on longevity in *Daphna*, J. W. MacArthur and W. H. T. Baillie (*Jour. Exp. Zool.*, Vol. 53, No. 2) come to the very interesting conclusion that increase of the metabolic rate due to increasing temperature shortens the life of the animal, in other words that the product of length of life and the heart rate is a constant. They thus support Rubner's view that "a definite sum of living action determines the physiological end of life."

Polarity and Regeneration.—C. D. Van Cleave (*Physiol. Zool.*, Vol. 2, No. 1) in a study of fission and reconstitution in *Stenostomum* finds that new head regions in animals about to divide by fission are dominant to those portions which lie immediately anterior to them. C. M. Child (*Physiol. Zool.*, Vol. 2, No. 3) shows that grafts in the case of *Corymorpha* act as organizers to form new axes. Simple incisions if made with lacerated edges may also act as organizers. The organizer, according to the author, is a physiological condition and thus the efficacy of one part of an animal to act as an organizer is a direct function of this condition. The results, Dr. Child finds, are in agreement with the axial gradient theory. He also discusses the question of organizers in amphibian development.

Variation, Evolution and Heredity.—In experiments with *Leptoplana*, H. Birnet Hovey (*Physiol. Zool.*, Vol. 2, No. 3) demonstrates a conditioned response brought about by using light and contact stimuli. By experimenting also with decerebrated animals it is shown that the cerebral ganglia are concerned in the learning process. Arthur M. Banta and L. A. Brown (*Physiol. Zool.*, Vol. 2, No. 3) find that light doses of alcohol, dried adrenal cortex, etc., increases the rate of development in *Moina* and that this increased rate of development counteracts largely the retarding effect of overcrowding, thus reducing the proportion of males occurring in cultures of mothers thus treated. By treating *Drosophila* makes with x-rays, L. G. Barth (*Physiol. Zool.*, Vol. 2, No. 2) obtains an effect on the organisms resulting in a deviation from the expected 1:1 sex ratio in the offspring. The author explains this by assuming a differential susceptibility of the X and Y sperm to *x*-rays. J. T. Patterson (*Jour. Exp. Zool.*, Vol. 53, No. 3) produces mutations in genes of somatic cells of *Drosophila* by use of *x*-rays on the young at various stages in development. The mutation here consists in a modification of the eye, and figures are given by the writer to show the rate of mutation in a given gene.

VERTEBRATE PALEONTOLOGY

BY FREDERIC B. LOOMIS

PROFESSOR, AMHERST COLLEGE

GENERAL

Vertebrate palæontology is seeking to find and present to the public representatives of all the varied groups of animals which have played a rôle in the history of life on land or in the water, so as to interpret the factors which have caused the ever changing form and habit of each of the many diverging lines. Not all parts of the land's surface, or of the bottom of the sea or lakes, are suitable for preserving a record for in most places the varying weather, temperature, etc. are destroying and have destroyed the skeletal remains which lie on the ground. It is only where skeletons are buried beneath a water seal, as in bogs, or under the flood plains of rivers, that there is a chance for preservation. The result is that the search is diverted to specially favorable regions which were in the past either boggy or adjacent to ancient broad-valleyed rivers. The first object is to find the skeletons, either fragmentary or complete, then to establish their relationships, and finally present this knowledge, along with the remains on which it is based, to the public. The general interest in the animals of the past has never been more intense. Never have there been so many expeditions searching the beds where animals are found; never have there been so many students engaged in the various studies.

FIELD EXPEDITIONS

University of Chicago.—More than a score of institutions sent out in 1929 field parties to all parts of the world. The University of Chicago has been all the year in South Africa, and at writing has not yet returned, but reports a large collection of ancestral reptiles, especially a skeleton of Pareiasaurus, the first to come to this country.

The American Museum of Natural History, New York, closed up its Mongolian expeditions on account of trouble with the Chinese government, but has received the collection made last year, which has dinosaur eggs different from those previously reported, and also a curious new type of elephant with lower tusks broadened out into shovel-like structures. They also collected in Honduras, Alaska, New Mexico and Florida, securing in the last mentioned state the skeleton of an ancient sea-cow.

The National Museum in Washington, D. C. worked in Florida, securing more human remains associated with bones of extinct animals. They also gathered dinosaur bones in New Mexico, several porpoise or whale skeletons in Maryland, and a skeleton of the early ancestor of whales, Zeuglodon, from Alabama. Beside these they secured a herd of eight three-toed horses, Mesohippus, from South Dakota, the largest group of horses ever found together.

Harvard sent an expedition into South Dakota and Nebraska, securing among other things a skeleton of the little camel Stemomylus. It also explored its attic and found there several skeletons collected years ago, such as the giant land bird, Æpyornis from Madagascar, a pterydactyl skeleton from Kansas with a spread of wings of 18 feet, a Diadectes from Texas, and the very early fish, Dinicthys. They also secured a skeleton of the European dinosaur, Plateosaurus.

Yale learned of a subfossil skeleton of a strange ground sloth, Nothotherium, in a Texas cave, which they secured and mounted, and have this summer been exploring this and adjacent caves.

The Carnegie Museum of Pittsburg has located a new and rich quarry for Unita mammals, which are generally so scarce, and which are much needed to fill the gap between the Eocene and the Miocene periods.

Other Discoveries.—Skulls of the three-horned dinosaur, Triceratops, were found in Montana by the Amherst College Museum, in Wyoming by the South Dakota School of Mines, and in Saskatchewan by the Victoria Museum at Ottawa. The Colorado Museum, in Denver, has a new deposit of early elephant bones. The University of Michigan collected a mammoth skeleton in Michigan. The University of Missouri, working in the Big Horn and Wind River Mountains, found a new locality for Devonian fishes, and a new and very early lot of fossil footprints of Pennsylvanian age and near Ten Sleep, Wyo. The Cleveland Museum has gathered quite a series of the skeletons of ancestral sharks from the beds near Cleveland. The University of California worked in the Pliocene beds of northern Texas, the University of Kansas in the beds of the same age in Western Kansas, and the California Institute of Technology in those of Northern Nevada, where they got a skeleton of the horse Hipparion leptode. The last institution also continued their surveying of the John Day Basin in Oregon. Both Princeton University and Trinity College were in the Big Horn Basin in Wyoming, the latter getting a skeleton of the large land bird, Diatrema. The University of Nebraska worked in the western part of that state and got, among other things, a group of five skeletons of the deer-like oreodont, Merychyus.

EXHIBITIONS

Most of the museums completed the mounting of striking exhibits and thus added to the opportunity of seeing these animals of the past when freed from the matrix in which they are found. The American Museum of Natural History assembled the extinct bison skeletons found at Folsom, N. M., and placed them out together with the eleven arrow heads which were found with them. They have prepared and put on exhibition a large part of the collections brought from India and Greece by Barnum Brown, one of the phases of the Asiatic Expedition. They have also placed on exhibition a group of five small camels. Stenomylus. The Colorado Museum has completed a group of extinct oreodons, including a male, female, and seven young of that strange form, Merycochoerus. The South Dakota School of Mines has a group of male and female oreodon gracilis. The University of Kansas installed a mount of a new tiny mosasaur, and a pterodactyl with an 18 feet spread of wings,—Pteranodon. Several new dinosaurs are available to public view, the giant Brontosaurus at Yale, an almost equally large Diplodocus at Washington, and a smaller but curious shaped form, Anchiceratops, at Ottawa. Amherst College mounted a cave near which were found remains associated with Neanderthal man near Vienna. Princeton is showing an early ancestral carnivor—Palæonictis. The Chicago Museum has completed its group of Neanderthal man with a background painted by Charles R. Knight, who also has made six large mural paintings to show the life and habitat of various of the early reptiles and mammals.

STUDIES AND PUBLICATIONS

Several outstanding studies have come to completion this year. Prof. H. F. Osborn's Monograph of the Titanotheria, long awaited, was published by the U. S. Geological Survey, three volumes, giving complete descriptions of all the titanotheres as well as studies in their adaptations and relationships. Dr. Chester Stock has completed his survey of the cats from the Rancho La Brea tar pits and this gives us the benefit of critical study of tremendous quantities of material, so that the range of variation inside of a species is made evident. Dr. G. G. Simpson gives us his summary study of the American Mesozoic Mammalia which makes it possible to get a much clearer idea of these earliest known mammals, and also makes evident that, at that early period, there was already a wide range of deviation, and that there is still a host of new forms to come from the late Mesozoic beds. The results of the South American expeditions of the Field Museum of Chicago are beginning to come out, these being the forerunners of a series, which with the Patagonian Reports of Princeton, give us better summaries of South American mammals than we have for the North American mammals. The first two to appear are the parts on the Carnivorous Marsulials by Sinclair, and Homalodontotherium by W. B. Scott.

Peterson has published a detailed description of Phenacocoelus. Then we have several descriptions of new or little known forms, such as E. C. Case's *Skeleton of Ostodolepis, A New Hedgehog* by W. D. Matthew, Birkenia Elegans by H. C. Stetson, and the skulls of Edmontia and Anodontosaurus by C. M. Sternberg, together with a host of descriptions of less complete material. Dr. O. P. Hay has completed his *Second Catalogue of North American Vertebrates*, being the bibliography from 1900 to 1925. It is noticeable that this bibliography of 25 years is about double the amount which is given in the first bibliography although that covered all the time up to 1900. During the year no new major discoveries have been made in the field of man in America; but considerable work has been done in Florida and Folsom, N. Mex. to get at the date when man was originally here in America, all of which tends to confirm the proposition that the time is at least as early as the end of the last glaciation.

BOTANY

BY MILDRED E. MATHIAS

MISSOURI BOTANICAL GARDEN, ST. LOUIS

PLANT PHYSIOLOGY

Light and Radiation.—The study of light and radiation has continued to hold an important position among the noteworthy physiological researches. Ultra-violet radiation constitutes a subject for many studies producing such contributions to the literature as Gates' two papers in *Journal of General Physiology* on "A study of the bactericidal action of ultra violet light. I. The reaction to monochromatic radiations. II. The effect of various environmental factors and conditions," "The killing of plant tissue and the inactivation of tobacco mosaic virus by ultra-violet radiation" by Arthur and Newell, and "The fungicidal action of ultra-violet radiation" by Fulton and Coblentz. The effects of *x*-rays and radium are discussed in two papers of interest by T. H. Goodspeed of the University of California—"The effects of *x*-rays and radium on species of the genus Nicotina" and "Cytological and other features of variant plants produced from *x*-rayed sex cells of Nicotina tabacum." Busse and Daniels have published the results of a study on "Some effects of cathode rays on seeds." Papers of interest on the subject of light are "The influence of light intensity and light quality upon the growth of plants" by H. L. Shirley, "Root formation and flowering of Dahlia cuttings when subjected to different day lengths" by P. W. Zimmerman and A. E. Hitchcock, "Configuration and some effects of light and gravity on Coffea arabica L." by C. H. Arndt, "Relation of composition of seed and the effects of light to growth of seedlings" by Miss Reid, "Opening of stomata in different ranges of wave lengths of light" by J. D. Sayre, "Some effects of radiant energy on plants" by J. M. Arthur, and "A spectrophotometric study of reflection of light from leaf surfaces" by C. A. Shull.

Mineral Nutrients.—Miss Reid, in *Contributions from the Boyce Thompson Institute,* has published two papers on the subject—"Growth of seedlings in light and in darkness in relation to available nitrogen and carbon" and "Effect of variations in the amounts of available carbon and nitrogen on the growth of wheat seedlings." Haas, working at the Citrus Experiment Station, University of California, has contributed to the subject with papers on the "Effect of nitrate salts upon growth and composition of tobacco leaves" and "Composition of walnut trees as affected by certain salts." Other papers, emanating from various laboratories in the country, may be listed as follows: E. S. Johnston and W. H. Dore, "The influence of boron on the chemical composition and growth of the tomato plant," Helen Sorokin and Anna L. Sommer, "Changes in the cells and tissues of root tips induced by the absence of calcium," F. M. Shertz, "The effect of potassium, nitrogen and phosphorous fertilizing upon the chloroplast pigments, upon the mineral content of the leaves, and upon production in crop plants," R. P. Bartholomew and G. Janssen, "The relation between concentrations of potassium in culture solutions and optimum plant growth," J. R. Skeen, "The tolerance limit of seedlings for aluminum and iron and the antagonism of calcium," J. F. Fonder, "A critical study of the influence of soil type on the calcium and magnesium content and other physiological characters of the alfalfa plant,"

T. W. Turner, "Effect of mineral nutrients upon seed plants. II. Phosphates," Constance E. Hartt, "Potassium deficiency in sugar cane," W. A. Albrecht and F. L. Davis, "Physiological importance of calcium in legume inoculation."

Study of Growth.—Mrs. Farr has continued the publication of a series on "Studies on the growth of root hairs in solutions" started by Dr. C. H. Farr, with papers VIII and IX —"Structural and intracellular features of collards in calcium nitrate" and "The pH-molar rate relation for collards in calcium nitrate"; and has contributed some results of her own studies on the same subject with a paper on "The pH molar-rate relation for Brassica oleraceae in calcium sulphate."

Citrus Researches.—The workers at the Citrus Experiment Station of the University of California have published several interesting papers on the citrus researches, among them: "Identification of certain species of citrus by colorimetric tests" by Halma and Haas, "Quantitative differences in palisade tissue in Citrus leaves" by Halma, "Mottle-leaf in Citrus artificially produced by lithium" by Haas, and "Chemical relationship between scion and stock in citrus" by Haas and Halma.

MORPHOLOGY AND ANATOMY

Pollen Grain.—R. P. Wodehouse has continued his extensive studies on the morphology of the pollen grain and has published three papers on the subject in American journals: "The origin of symmetry patterns of pollen grains," "Pollen grains in the identification and classification of plants. III. The Nassauvinae" and "IV. The Mutisieae."

The Cucurbitaceæ, particularly the genus *Cucurbita,* have been the subject of much morphological study as indicated by such works as Miller's on the "Staminate flower of Echinocystis lobata," "Developmental history of the fruit in lines of Cucurbita pepo differing in fruit shape" by Sinnott and Durham, and two papers by J. E. Judson entitled "The floral development of the staminate flower of the cucumber" and "The morphology and vascular anatomy of the pistillate flower of the cucumber."

Morphological Studies.—Johansen has begun a series of morphological studies on the Onagraceae with a paper on "The megagametophyte of Hartmannia tetraptera." A. W. Haupt has published two papers of a series of "Studies in California Hepaticae." Bartoo has contributed to our knowledge of the morphology of *Schizaea rupestris* with two papers—one on the development of sporangium and the other on the origin and development of root tissues. Articles concerning some of the lower forms are those by Miss Lander on "Oogenesis and fertilization in Volvox," J. R. Mundie on "Cytology and life history of Vaucheria geminata," "Morphological and phenological notes on Zostera marina L." by W. A. Setchell, and "Observations on the development of zoospores and gametes in Pleurophycus Gardeneri" by Laura Angst.

Anatomical Studies.—Saeger has published a paper on "The flowering of Lemnaceae," in which he reports the finding of flowers in species in which flowering has rarely, if ever, been observed. Sister Mary Joseph Therese Geiger has published an extensive paper on "A study of the origin and development of the cormlet of Gladiolus." Sponsler has contributed to our knowledge in the field of anatomy with a discussion of "The mechanism of cell wall formation." Miss Foster has made an important contribution in a paper entitled "Investigations on the morphology and comparative history of development of foliar organs 1. The foliage leaves and cataphyllary structures in the horse chestnut (Aesculus Hippocastanum L)."

TAXONOMY

Publications.—Miss Perry of the Gray Herbarium, Harvard University, has published "A tentative revision of Alchemilla § Lachemilla"; other contributions from the Gray Herbarium have been papers by I. M. Johnston on the flora of northern Chile and Peru; studies by Fernald and Miss Brackett on the species *Eleocharis palustris;* and "Monographic Studies in the genus Eleocharis" by H. K. Svenson, which have appeared in several issues of *Rhodora*. H. A. Gleason of the New York Botanical Garden has continued his taxonomic studies of the plants of northern South America and has published treatments of the genus *Monochaetum* in both North and South America. The publication of *The North American Flora* has continued with contributions by Rydberg on the Fabaceae, constituting Parts 5, 6 and 7 of Volume XXIV. Rydberg has also continued his publication of "Genera of North American Fabaceae" with especial reference to Astragalus and related genera. The department of botany of Pomona College has continued its taxonomic activity with the publication of several noteworthy contributions, primarily studies in the family of Onagraceae but including "A revision of the genus Collinsia (Scrophulariaceae)" by Miss Newsom. The works on the Onagraceae have included "A revision of the genus Zauschneria" by Miss Hilend, "A study of the genus Clarkia, with special reference to its relationship to Godetia" by Munz and Hitchcock, and "Studies in Onagraceae," III and IV, namely, "A revision of the subgenera Taraxia and Eulobus of the genus Oenothera" and "A revision of the subgenera Salpingia and Calylophis of the genus Oenothera" by Munz, which are outstanding contributions to our knowledge of a much confused genus. The *Annals of the Missouri Botanical Garden* have contained several short papers, the result of the various taxonomic researches in progress at that institution, among them a description of a new variety of *Senecio* by Dr. J. M. Greenman, a description of a new variety of *Amsonia* by Woodson, studies on the genus *Agave* by Greenman and Mrs. Roush, and continued studies on the Umbelliferae by Miss Mathias. The *University of California Publications in Botany* have contained two works of taxonomic importance, namely, "The genus Microdictyon" by Setchell and "A systematic study of the genus Lessingia Cham." by J. T. Howell. Miss Watson has made a noteworthy contribution to our knowledge of the Compositae with "Contributions to a monograph of the genus Helianthus," an extensive treatment of a genus well represented in our flora. E. E. Sherff has also continued his intensive studies in this family with a paper on "New or otherwise noteworthy Compositae, III." Mrs. Chase of the United States National Herbarium has published an extensive treatment of "The North American species of Paspalum."

MYCOLOGY

North American Fungi.—Outstanding among contributions in mycology is *Icones Farlowianae* with over one hundred plates in color of the larger fungi of North America made by Bridgham and Krieger under Dr. Farlow's direction and with a descriptive text by E. A. Burt. Another important work is Seymour's *Host Index of the Fungi of North America*. Another host index appearing in 1929 is that by Miss Lieneman to the North American species of the genus *Cercospora*. Of more general interest is a list of *The fungi of Manatoba* prepared by Bisby, Buller and Dearness.

Plant Rusts.—In connection with the extensive researches on the rust fungi there has appeared one general work edited by J. C. Arthur, entitled *The Plant Rusts*, containing treatments of the cytology, morphology, physiology, pathology, teratology, etc., of the rust fungi with contributions by Kern, C. R. Orton, Fromme, Jackson, Mains and Bisby. A more specific study of the rust fungi is that reported by E. B. Lambert on "The relation of weather to the development of stem rust in the Mississippi Valley." Two interesting papers on the white pine blister rust are those of Snell on "Some observations upon the white pine blister rust in New York" and Spaulding on "White-pine blister rust: a comparison of European with North American conditions."

Plant Reproduction.—An article of general interest, particularly since it follows Kniep's important book on sexuality in the lower plants, is that by Link on "Reproduction in Thallophytes, with special reference to fungi." Of interest to the taxonomic student of the fungi are such papers as Kauffman's "A study of the fungous flora of the Lake Superior region of Michigan, with some new species," Coker's "Notes on fungi" and the following monographic treatments: "Hysterangium in North America" by Zeller and Dodge, "A monograph of Septobasidium.—Part I. Jamacian species" by Cloch and "A monograph of the helicosporous Fungi Imperfecti" by Linder.

CYTOLOGY

Oenothera. — Cytological publications in 1929 have been concerned primarily with the subject of cytological behavior of the genus *Oenothera* with the following titles: Johansen, "New chromosome numbers in the Onagraceae"; S. H. Emerson, "Chromosome configuration in a dwarf segregate from *Oenothera 'franciscana sulfurea'"*; Cleland and Oehlkers, "The cytological basis for genetical peculiarities in the Oenotheras"; Illick, "A cytological study of meiosis in the pollen mother cells of some Oenotheras"; Kulkarni, "Meiosis in pollen mother cells of strains of Oenothera pratincola Bartlett," "Meiosis in the sporocytes of two mutations of Oenothera pratincola and their hybrids," "Meiosis in *Oenothera franciscana.*"

Nicotiana.—Publications from the University of California have included cytological studies of the genus *Nicotiana*, namely: Goodspeed and Avery, "The occurrence of chromosome variants in Nicotiana alata Lk. et Otto," Hollingshead, "Chromosome number and morphology in Nicotiana. III. The somatic chromosomes of N. longiflora Cav.", and Avery, "Chromosome number and morphology in Nicotiana. IV. The nature and effects of chromosomal irregularities in N. alata var. grandiflora."

GENETICS

Roses.—An outstanding contribution to our knowledge of the field of genetics, as well as the field of cytology, is the publication by Mrs. Erlanson containing some of her results from intensive studies on the genus *Rosa* entitled "Cytological conditions and evidences for hybridity in North American wild roses."

Oenothera has also been the subject of continued genetical interest indicated by such publications as those of Mrs. Blanchard on "The genetical constitutions of Oenothera pratincola and its revolute-leaved mutations," and S. H. Emerson on "Multiple-factor inheritance in crosses between *Oenothera gradiflora* and *Oenothera franciscana.*"

Datura.—Blakeslee has continued his studies of the genus *Datura* with the publication of a paper on "Cryptic types in Datura" and a joint paper with Buchholz on "Pollen-tube growth in crosses between balanced chromosomal types of Datura Stramomium."

Maize.—The genetical study of maize has been the subject of numerous papers, in connection with which it is of interest to mention a symposium on the biology of maize held at the Des Moines meeting of the Botanical Society of America including a discussion of the genetics of maize. The following papers indicate the extent of the study of the genus: R. A. Emerson, "Genetic notes on hybrids of perennial Teosinte and maize" and "The frequency of somatic mutation in variegated pericarp of maize"; H. K. Hayes and H. E. Brewbaker, "Linkage studies of factor pairs for normal *vs.* glossy seedlings and flinty *vs.* floury endosperm in maize"; C. K. McClelland and G. Janssen, "Multiple ear character of corn"; F. A. Abegg, "Effects of waxy and sugary genes on reserves with special reference to modification of the waxy ratio in maize"; Barbara McClintock, "A cytological and genetical study of triploid maize"; R. A. Brink and C. R. Burnham, "Inheritance of semi-sterility in maize"; R. A. Brink, "An enzyme difference associated with the waxy gene in maize"; E. W. Lindstrom, "Linkage of qualitative and quantitative genes in maize" and P. C. Mangelsdorf, "The relation between length of styles and Mendelian segregation in a maize cross."

ECOLOGY AND PLANT GEOGRAPHY

Plant Distribution.—Works of interest in the study of plant distributions and a knowledge of local floras are the following: St. John, "Plants of the headwaters of the St. John River, Maine," Transeau and Williams, "Distribution maps of certain plants in Ohio," Berry, "Fossil plants and mountain uplift in the Pacific states," Peattie, "Flora of the Tryon region. Parts II and III," Eastwood, "Studies in the flora of lower California and adjacent islands," Fassett, "Preliminary reports on the flora of Wisconsin I. Juncaginaceae, Alismaceae. II. Ericaceae," Mahony, "Preliminary reports on the flora of Wisconsin III. Lobeliaceae, Campanulaceae, Cucurbitaceae."

Local Flora.—There have been numerous studies of the vegetation of limited regions, outstanding among which are Harshberger's "The vegetation of the screes, or talus slopes of western North America," Shreve's "Changes in desert vegetation," Phillips's "Life-forms and biological spectra of the flora of Bacon's Swamp, Indiana," Palmer's "The ligneous flora of the Davis Mountains, Texas," Irwin's "The cedar cliffs prairie opening of the Cincinnati, region," Core's "Plant ecology of Spruce Mountain, West Virginia," and "The hydrogen ion concentration of the habitats of the Bryophytes and Pteridophytes of the Douglas Lake region" by Robinove and La Rue, "Factors controlling forest types on the Cloquet Forest, Minnesota," by Carson, Allison and Cheyney, and "Studies on northern Michigan bog lakes," by Jewell and Brown.

ECONOMIC BOTANY

BY H. K. HAYES

PROFESSOR, UNIVERSITY OF MINNESOTA

RUSSIAN FIELD CROPS

An interesting paper is published in Volume I of the *Proceedings* of the International Plant Science Congress held in Ithaca in 1926. The article on Russian field crops in the United States by D. N. Borodin points out the enormous value to American agriculture of spring and winter wheat varieties originally imported from Russia. Russian varieties of oats, rye, millet, flax, sunflowers, alfalfa and other forage crops have played an important part also in the success of economic crop plants in various sections of the United States. The original importations have become adapted to various sections of our country. Through long years of effort and by means of selection and hybridization, new forms have been evolved which differ in their combination of characters from the original Russian varieties. These newer varieties of crop plants which have been produced during more recent years are being reintroduced into Russia as a source of further improvement of Russian varieties. This volume published by the George Banta Publishing Co., Menasha, Wisconsin, 1929, contains other important articles in relation to economic plants written by investigators of international reputation.

DISTRIBUTION OF WHEAT CLASSES AND VARIETIES

A summary is given of the wheat acreage in United States in 1919 and 1924 with an estimated acreage of varieties in the individual states and in the United States as a whole (see U. S. Department of Agriculture *Bulletin* No. 1498, 1929). The summary includes acreage and varieties of wheat of the classes hard red spring, durum, hard red winter, soft red and white wheats. The acreage of these five important groups in the various states and of many of the more important varieties is illustrated by the use of maps. Short descriptions of important varieties with a statement of their outstanding characteristics adds greatly to the value of the study.

WEED CONTROL BY THE USE OF CHEMICALS

Sodium Chlorate.—Studies have been continued during the year by agricultural experiment station investigators and others for the purpose of learning the feasibility of destroying weeds by the use of chemical treatment. Recent investigations have been conducted chiefly with the aim of killing perennial weeds such as field bindweed, quack grass, Canada thistle, sow thistle and leafy spurge. Circulars or other publications describing the methods have appeared from the Ohio, New York, North Dakota, Kansas, Indiana and Minnesota Agricultural Experiment Stations and from the U. S. Department of Agriculture. Sodium chlorate has been recommended rather widely. It is soluble in water. Rates of application have varied from 100 to nearly 1000 pounds per acre. The most satisfactory results have been obtained by two or more applications in the form of a spray. Sodium chlorate treatment is practical only for the comparatively small areas that precede infestation of the entire fields or for fence rows. Its use at the heavier rates of application make land sterile for crop plants for approximately 6 months after the last application.

Sodium chlorate has the serious defect of being highly inflammable when mixed with organic dust and instances have been recorded of setting a field on fire by simply walking through it after it had been sprayed with sodium chlorate and become dry. These properties of sodium chlorate led to the publication (*Industrial and Engineering Chemistry*, 1929, Vol. 21, p. 397) of a note objecting to the use of sodium chlorate on the farm. Sodium chlorate is toxic to animals, one conclusion being that it is harmful in any amount above 50 grams. An interesting historical review with literature citations, regarding the use of chemicals as means of eradicating annual and perennial weeds was published during the year by Wilbert C. Hopper (*Scientific Agriculture* Vol. 10:128-135).

ECOLOGY AND ECONOMIC BOTANY

Chrysanthemums.—Controlling the time of blossoming of chrysanthemums has been reported by Dr. H. A. Allard (*Yearbook U. S. Dept. of Agriculture* 1928, p. 194). Usually chrysanthemums blossom in October and there has been a general belief that the cool days of autumn initiated flowering. Cuttings of a late variety made in winter grew to bushy plants by May. These were exposed to only 10 hours of daylight, from 5:30 a. m. to 3:30 p. m. and moved to a light proof case each day. Plants consistently given this treatment have flowered as early as July 15 while check plants exposed to ordinary daylight did not flower until the middle of October. Such methods may be used by the practical grower to hasten time of flowering or by the breeder to induce flowering of early and very late varieties at similar periods so that crosses can be made.

Onions.—MacClelland has pointed out (*Jour. Agr. Research*, 1928, Vol. 37:603-628) the effect of light as a means for the control of bulb formation in onion varieties. He found that light sufficient to induce bulb formation in one variety of onion was not suitable to induce it in another variety. For that reason varieties adapted to temperate climates might not succeed in the tropics.

Effect of Light on Plants.—Shirley reports the influence of light intensity and quality upon the growth of plants (See *Amer. Jour. Botany*, 1929, 16; 354-390). By the use of houses with different colored glass roofs it was possible to compare ordinary daylight with other light rays. One glass removed the ultra-violet rays, another the red, while a third transmitted red, yellow, and green and a fourth mostly red and yellow. Plants grown in red light were weak and spindly while those in blue light looked somewhat stunted. It was concluded that white daylight was the most efficient for the growth of plants. Young trees and plants were grown also under a series of cloth covers of different mesh which gave shades corresponding to those in a forest (See *Technical Notes* No. 17 Lake States Forest Experiment Station, U. Farm, St. Paul. Minn.). Trees could survive if they obtained only one percent of normal daylight. Plants receiving 10 to 15 percent of normal daylight grew well, but were taller and weaker than those receiving from 30 to 50 percent. The conclusion was reached that canopies which cut off 50 percent of normal daylight may prove even more advantageous than full daylight for the growth of young trees.

Forest Light.—Steinbauer (*Thesis, U. of Minnesota* 1929) describes a method for the determination of the quality of forest light with a portable spectophotometer and a method of differentiating between the different sources of light. Light intensities under various species of trees varied from less than 1% of the intensity of normal sunlight to over 10%. The ecological significance of different types of forest investigation is evident.

PHYSIOLOGICAL STUDIES OF ECONOMIC PLANTS

Tests With Maize.—Three strains of maize which had been bred by controlled pollination were used for the study (see *Plant Physiology,* 1929. 4:165-192). There was a close correlation between the total quantity of chlorophyll contained in the leaves and their dry weight of tops. The authors say, "Since none of these strains could be classed as chlorophyll deficient by observation, it seems likely that chlorophyll tests may become of considerable value in the improvement of corn." They suggest such tests as an aid in isolating the more vigorous pure lines.

Potato Tubers.—The superiority of northern grown potato tubers is generally recognized. In a recent study (*Jour. Agr. Res.,* 1929, Vol. 38, pp. 405-410) normal healthy seed stocks were produced in soil at different temperatures and varying moisture content to determine to what extent such factors exerted an influence on productivity. While soil temperature, soil moisture and soil texture affected the characteristics of the tubers produced, there was no transmissable modification when tubers produced under these controlled conditions were used and their productivity tested in comparable field trials. This is further evidence that the virus diseases of potatoes are the chief cause of the deterioration of seed stocks.

Hardiness Tests.—Early Jersey Wakefield cabbages were used by Harvey (Paper presented at Northwest Assoc. of Horticulturists, Entomologists and Plant Pathologists, Bozeman, Montana, June 1929) to learn the relative effectiveness of various temperatures and time exposures in evoking hardiness. The threshold value for producing hardiness was found at about +5°C. Alternate exposures, twelve hours at 0°C. and twelve hours at 10°C. or 20°C. produced greater hardiness than exposure continuously at 5°C. The effect of short exposure, one hour per day at 0°C. overbalanced exposure for twenty-three hours per day at temperatures higher than the threshold value for producing hardiness. Harvey suggests "that hardiness in plants is a cold shock response."

CORN IMPROVEMENT

The annual report of progress of workers in corn improvement in the twelve states adopting this as a regional program under the Purnell Act contains summary statements from Illinois, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, New Jersey, New York, North Dakota, Ohio, South Dakota and Wisconsin. The method of work consists for the most part of the isolation of the best possible inbred lines and the use of these lines in producing single or double crosses or synthetic varieties. Corn is a naturally cross-pollinated plant and the former method of selecting seed without the use of controlled pollination had the serious defect that the male parentage of a selected ear was not controlled. The newer method is based also upon selection but controlled pollination gives an opportunity to isolate pure types, *i.e.,* those that breed true for ability to withstand lodging, resistance to diseases and for desirable agronomic characters. No inbred lines have been obtained which are as vigorous as normal corn. First generation crosses often yield more than normally pollinated varieties which has led to the hybridization method of corn seed production. By this method seed for commercial planting is obtained by making a cross each year. This is accomplished easily by planting the two sorts to be crossed in alternate rows and detasseling all of one line before the silks appear. Seed from the detasseled rows is used for commercial planting.

The ears and seeds of inbred lines are small in comparison to normal corn. This led to the plan of using double crosses, a double cross being a first generation cross between two single crosses. All crosses do not yield well, the more desirable can be determined only by field trials. Four double crosses were entered in Iowa corn yield trials in 1928 in competition with the best open pollinated varieties. Excess yields for the crosses over the normal corn were from 1 to 10 bushels per acre. Four double crosses studied in Minnesota yielded an average of 15 percent more than normal corn and matured about a week earlier. These crosses are being increased for distribution to farmers. It is apparent that the use of double crossed seed necessitates the controlled production each year of seed of four inbred lines, the production of seed from two first generation crosses and the more extensive production of the double cross to obtain seed for commercial planting. Kiesselbach of Nebraska has obtained evidence which leads to the belief that it may be possible to produce two synthetic varieties, each having two inbred lines as parents and that crosses between such varieties may be expected to yield as well as double crosses obtained from the same four lines. This would greatly simplify the use of the hybridization method of corn improvement.

INDUCED MUTATIONS AND CROP IMPROVEMENT

Further data have been presented during the year regarding induced variations as the result of the effect of x-rays and radium. It has been proved definitely that the variations are of two sorts. In some cases there is a modification of a single hereditary factor or gene, while other induced variations are the result of chromosomal aberrations. Gene changes have been induced by Stadler with cultivated varieties of barley. An entire number of the *Journal of Heredity* which appeared in June, 1929 was devoted to the discussion of such induced variations. An article appearing in this volume describes changes in the tobacco genus, *Nicotiana*, induced by x-rays and the gamma rays of radium, which were explained on the basis of chromosomal aberrations. The editor of the *Journal of Heredity* says, "The subject of heredity is becoming more complicated and more important every day and this field of gene transmutation is certain to be investigated intensively. That it will yield much of practical importance seems likely, that it may prove the key to the cause of variation and thus of evolution has been seriously suggested."

TROPICAL PLANTS

Because of the limited number of available books dealing with tropical crop plants, an authoritative book in this field deserves consideration (see *The Tropical Crops* by Otis Warren Barrett, Macmillan Co. 1928). The author depends for the most part on first-hand information having had 30 years experience with tropical crops. The geography, climatic and living conditions of the tropics are given together with the tropical field practices. Each of the important tropical crops such as coffee, cocoa, tea, sugar cane, citrus fruits, banana, cocoanut and rubber are treated in detail.

ENTOMOLOGY

By E. Porter Felt

Director and Chief Entomologist, Bartlett Tree Research Laboratories

SOCIETIES AND MEETINGS

The American Association of Economic Entomologists held its 41st annual meeting at Columbia University, New York City, Dec. 27-31, 1928. Dr. T. J. Headlee of New Jersey was elected President and C. W. Collins of Massachusetts, Secretary-Treasurer. The 14th annual meeting of the Pacific Slope Branch was held at Berkeley, Calif., June 20-21, Chairman, O. H. Swezey, Honolulu, Secretary-Treasurer, Roy E. Campbell. The 4th annual meeting of the Cotton States Branch was held at Houston, Tex., Feb. 6-7; Chairman, F. L. Thomas, Texas; Secretary-Treasurer, Oliver I. Snapp, Georgia. The northeastern Branch met at the American Museum of Natural History, New York City, Nov. 21-22, Chairman, Dr. E. N. Cory, Maryland, Secretary-Treasurer; Dr. H. B. Weiss, New Jersey.

The Entomological Society of America held its 23rd annual meeting in New York City, Dec. 27-28. Prof. C. T. Brues, Massachusetts, was elected President and Prof. J. J. Davis, Indiana, Secretary-Treasurer. The annual address was delivered by Dr. R. N. Chapman, Minnesota.

Other Meetings.—The 6th annual Rocky Mountain Conference on Entomology was held at Pringree Park, Colo., August 19-24. The American Honey Institute, organized in March 1928 for the dissemination of information regarding honey and its dietetic value, held its annual meeting at Sioux City, Iowa, February 7-9.

PLANT QUARANTINE AND CONTROL ADMINISTRATION

Administrative Changes.—Dr. C. L. Marlatt, who for the past 18 months has been filling the two positions of Chief of the Federal Bureau of Entomology and Chief of the Federal Plant Quarantine and Control Administration, retired on his own request from the latter position and Dr. Lee A. Strong of California was appointed, effective Dec. 1, Chief of the Plant Quarantine and Control Administration and in addition will serve ex-officio as Chairman of the Advisory Federal Plant Quarantine Board made up of representatives of several Bureaus of the U. S. Department of Agriculture.

Economic Value of Quarantines.—The developments of the last few years have been followed by serious questions as to the economic value of quarantine and large scale control measures, comparatively recent activities which have cost the Federal Government and the various states approximately $100,000,000 in the last twenty-five years. These questions have naturally been raised mostly by those adversely affected by such restrictions. Entomologists not directly concerned with the administration of quarantines have questioned the real value of this work (see Nov. 8th issue of *Science* and the September issue of the *Scientific Monthly*). Both of these authors favor a comprehensive and impartial study of all phases of this very complex situation.

Mediterranean Fruit Fly.—The discovery early in April of this dreaded insect in Florida was quickly followed by the placing of drastic Federal and State Quarantines upon the infested area and the speedy inauguration of eradicative measures made possible through Congressional authorization of the expenditure of $4,250,000 for this purpose, the funds being transferred from another appropriation. The infested area comprises some 72% of the bearing citrus trees, and from this section originated 80% of the carload shipments. Enormous quantities of fruit were destroyed in the infested groves and serious financial difficulties developed, the failure of some 20 local banks presumably being a sequence of the drastic regulations and the consequent interference with fruit shipments. No flies have been found in the infested area since late July, though no adequate explanation for this has been advanced. The Secretary of Agriculture appointed in midsummer a Commission of seven outstanding specialists representing leading agriculturists and especially entomologists to study the situation. In October, a second special committee with a fuller representation of leading agriculturists and several entomologists also made a careful study of the situation at the request of the Secretary of Agriculture, both committees endorsing the attempt to eradicate the insect. A sharply critical discussion of the fruit fly situation in the Nov. 8th issue of *Science* raises serious questions as to the probability of eradication and the efficiency of quarantines. A development of more than passing interest has been the commissioning of Prof. H. J. Quayle of the University of California to study this insect in countries along the Mediterranean and possibly other sections for the purpose of ascertaining its real economic status and the possibilities of artificial control.

Japanese Beetle.—There was a revision, mostly an extension of the territory coming under quarantine regulations, the states of Maryland and Virginia and the District of Columbia being included for the first time. There has been a moderate extension of the known generally infested area the past season. The insect was found in a number of distant or outlying points, such as Willimantic, Conn., Providence, Boston, Kingston and Binghamton, N. Y., and Cape Charles and Norfolk, Va., these being developments of much the same character as those of the preceding year. Urgent recommendations have been made to have some of these outlying points included within the quarantined area. The past season has been marked by the use of large numbers of beetle traps as aids in locating new infestations, and for the additional purpose of testing their value in the reduction of the number of outlying colonies.

Other Asiatic Beetles.—A quarantine was promulgated late in March applying to two insects in particular, the Asiatic beetle, *Anomala orientalis*, and the Asiatic garden beetle, *Aserica castanea*, both related to the Japanese beetle, though of decidedly less economic importance. This quarantine applied to five states and the District of Columbia, the regulated area being practically coincident in most of these states with that of the Japanese beetle. The past season, outlying infestations by these two insects have been found in Connecticut, New York and Delaware, and vigorous representations have been made for the abolishment of this quarantine on the ground that the insects are not of sufficient economic importance to justify such restrictive measures.

Gypsy Moth.—This insect is becoming more abundant in the territory between the Connecticut River and the barrier zone in western New England and eastern New York, thus threatening the integrity of this project unless vigorous control measures are put into effect shortly in the adjacent eastern area. There has been rather general defoliation of forests in portions of eastern New England, especially southeastern Massachusetts.

Satin Moth.—The quarantine on this insect has been extended to include a number of towns in several of the New England states, Vermont being invaded for the first time.

European Corn Borer.—There has been, as was to be expected, an extension of the infested area. There is a possibility that the whole of the State of Connecticut will come under quarantine regulations. The injury in New York State the past season has been less rather than greater and the same is true of Ohio.

Cotton Pink Boll Worm.—Infestations were discovered the latter part of October in the salt river valley of Arizona and the quarantine upon this insect has been extended to include Maricopa and Pima counties. Recently published data indicate a strong probability of the moth drifting northward from infested areas in Mexico to various sections in southwestern United States. Limitations placed upon the large Federal appropriation for the maintenance of a non-cotton zone prevented the use of much of the money for this purpose.

COÖPERATIVE INVESTIGATION AND CONTROL

Plans and Problems.—Comprehensive plans for coördinated investigations of various serious insect pests have progressed satisfactorily. There was a very generally attended meeting late in December of Federal workers and representatives of 17 states for the discussion of coddling moth problems and plans for more efficient control. A joint committee representing entomologists, agronomy, agricultural engineers and farm economics has for several years given similar consideration to the numerous and complicated problems, in relation to the European corn borer situation. There has been very general interest in methods of controlling the oriental fruit moth, though there has not been an equally close organization of effort.

Biological Control.—There is a very active interest in this method of controlling insects, particularly since the possibilities of quantity production in the use of a small egg parasite, Trichogramma, has been demonstrated. Efforts are being made to apply this information to the control of the sugar cane borer in the South and the European corn borer and the oriental fruit moth in the North. Another parasite attracting attention is known as Macrocentrus ancylivora, a parasite of this peach insect and also of the strawberry leaf roller. California has made great strides along this line and at the present time forty million lady beetles or lady bugs are being reared annually in insectaries in southern California and released in orchards infested by the Citrophilus mealybug.

Mexican Bean Beetle.—This serious enemy of southern states has greatly extended its range the past season, appearing for the first time in portions of southeastern New York, including Long Island, southwestern Connecticut, western Massachusetts and infestations have also been reported from the Province of Ontario, Canada.

TEXTS AND MONOGRAPHS

Introduction.—There have been a number of very desirable additions to the permanent literature of entomology. *Elementary Lessons on Insects,* by James G. Needham, Charles C. Thomas, Springfield, Ill.; *Ants, Bees and Wasps, a Record of Observations of the Habits of Useful Hymenoptera,* by Sir John Lubbock (Lord Avebury), new edition, E. P. Dutton & Company, a revision of an older and decidedly popular work.

Popular, Economic.—"Some Garden Pests, What They Are and How to Control Them," by C. T. Gregory and J. J. Davis, *Better Homes and Gardens,* Des Moines, Iowa (written for the gardener); *Insects and Their Control,* by Andrew Wilson, Thatcher & Anderson Company, New Brunswick, N. J. (Deals specially with insects affecting garden plants and trees.)

Economic Texts.—*Principles of Forest Entomology,* by S. A. Graham, McGraw-Hill Book Company, New York (a real contribution in its field); *A Manual of External Parasites,* by Henry Ellsworth Ewing, Charles C. Thomas, Springfield, Ill. (fills a very important place in economic literature); *Laboratory and Field Ecology, the Responses of Animals as Indicators of Correct Working Methods,* by Victor E. Shelford, Williams & Wilkins Company, Baltimore (an excellent guide to ecological methods); *Insects, Ticks, Mites and Venomous Animals,* by Walter S. Patton and Alwin M. Evans, Department of Entomology, Liverpool School of Tropical Medicine (a standard in its field).

Reference Works of Collegiate Grade.—*The Problems of Applied Entomology,* by Robert A. Wardle, McGraw-Hill Book Company, New York (an excellent discussion); *The Principles of Applied Zöology,* by Robert A. Wardle, Longmans, Green & Company, London (similar to the preceding but occupying a broader field); *Principles of Systematic Entomology,* by G. W. Ferris, Stanford University Press; *Locusts and Grasshoppers, A Handbook for their Study and Control,* by B. P. Uvarov, Imperial Bureau of Entomology, London; *Insect Nutrition and Metabolism, A Summary of the Literature,* by B. P. Uvarov, Imperial Bureau of the Entomological Society of London.

Systematic and Technical Works.—*A Handbook of the Dragonflies of North America,* by James G. Needham, and Hortense B. Heywood, Charles C. Thomas, Springfield, Ill. (a comprehensive introductory work). *A Revision of the Rhipiphoridæ of North and Central America,* by Ezekiel Rivnay; "The Fulgoridæ or Plant Hoppers of Mississippi," by H. L. Dozier, *Technical Bulletin 14,* Miss. Agri. Expt. Station; *A Contribution*

Toward a Monograph of the Adelginæ (*Phylloxeridæ*) *of North America*, by P. N. Annand, Stanford University Press (a comprehensive systematic and biological discussion); *Family Empididæ, Genera Insectorum, Diptera*, by A. L. Melander, *Family Tipulidæ, Sub-family Tipulinæ*, by C. Pierre; *Family Tipulidæ, Sub-family Cylindrotominæ*, also *Family Ptychopteridæ and Family Tanyderidæ*, all by C. P. Alexander in Genera Insectorum.

Miscellaneous.—Continued work on artificial insemination of queen bees has resulted in marked improvements (see December *Journal of Economic Entomology*). The September issue of the *Journal* of the New York Entomological Society reproduces a long series of the letters of the late Dr. E. A. Schwarz and gives many intimate glimpses of the character of this veteran entomologist and friend to so many earlier workers. There has been established in the Academy of Natural Sciences of Philadelphia a fund which is to be known as the Brackenridge Clemens Memorial Fund for the purpose of maintaining the important collection of America's pioneer student of the Microlepidoptera.

PERSONNEL

Prof. R. A. Cooley, State Entomologist and Head of the Department of Entomology of the University of Montana, has retired from active work after thirty years of service. He continues as research professor in entomology and entomologist for the State Board of Entomology. Prof. H. Garman has retired as Head of the Entomology Department of the University of Kansas, he being succeeded by Walter A. Price of Indiana. Prof. H. L. Dozier resigned as State Entomologist of Delaware to accept the position as head of the entomological work, Department of Agriculture, Republic of Haiti. His successor is L. A. Stearns of Ohio.

NECROLOGY

Dr. H. G. Dyar, an internationally recognized authority on Lepidoptera (butterflies and moths) and mosquitoes died at Washington, January 21st. Professor W. T. Clark, a pioneer California entomologist, died Apri 18th. Dr. F. H. Chittenden, one o the earlier economic entomologists died at Washington and Dr. F. W. McColloch, one of the younger and outstanding investigators, died a Manhattan, Kans.

COGNATE SOCIETIES

American Anthropological Society, 45 W. 45th St., New York City.
American Association of Economic Entomologists, Melrose Highlands, Mass.
American Assn. of Museums, 2 W. 46th St., N. Y. C.
American Nature Assn., Lakewood, N. J.
American Nature Study Society, Cornell University, Ithaca, N. Y.
American Ornithologists' Union, 1939 Biltmore St., N. W., Washington, D. C.
American Society of Naturalists, University of Pennsylvania, Philadelphia, Pa.
American Society of Zoologists, University of Minnesota, Minneapolis, Minn.
Botanical Society of America Cornell University, Ithaca, N. Y.
Entomological Society of America 1900 Race St., Philadelphia, Pa.
National Assn. of Audubon Societies, 1974 Broadway, New Yor City.
New York Microscopical Society American Museum of Natural History, N. Y. C.
New York Zoological Society, 10 Park Ave., N. Y. C.
Paleontological Society of America, American Museum of Natura History, N. Y. C.
Reptile Study Society of America Inc., 108 Convent Ave., New Yor City.
Zoological Society, 101 Park Ave New York City.

DIVISION XXIII

MEDICAL SCIENCES

PHYSIOLOGY

By Percy G. Stiles
Harvard Medical School

THE INTERNATIONAL PHYSIOLOGICAL CONGRESS

An important scientific event of 1929 was the meeting of the XIIIth International Physiological Congress in Boston, the first gathering of this large body on this side of the Atlantic. There was an attendance of above 1600. About 400 papers were presented and from the proceedings the following reports are for the most part selected. Physiology, like other biological sciences, is increasingly featured by quantitative studies. Yet the Boston program contains a surprisingly high proportion of the old-fashioned qualitative matter.

THE NERVOUS ORGANIZATION

The Sympathetic Nervous System.—This department of the nervous organization is usually said to regulate the activities of three types of tissue: the muscle of the heart, the smooth or visceral muscle and the secreting cells of various glands. Evidence has accumulated to show that it also comes into some relation with striped or skeletal muscle. The exact significance of this relation is not clear. The claim has been made that the sympathetic system influences the tonus or sustained contraction of the voluntary muscles but this has been vigorously denied. Russian workers have been led to believe that the sympathetic function is restorative in character, promoting recovery from fatigue. A recent experimenter (Britton) has made observations not inconsistent with this view. His work indicates that muscles having normal sympathetic connections are better supplied with their chief reserve substance,—glycogen,—than are muscles deprived of this type of nervous government. The sympathetic thus seems to favor the deposit of fuel and so to promote the endurance of muscles in action.

While we know of many reactions in which the sympathetic system is concerned attention should also be called to the fact that animals may survive the complete removal of this complex of ganglia and pathways. The elaborate operation involved has been well borne by cats and dogs (Cannon). In at least one case an animal so treated has given birth to young. No doubt the loss of the sympathetic reduces the capacity for adaptation and the power to meet hard conditions but it is not fatal.

Using a delicate technique and apparatus originally devised for the radio American investigators (Erlanger and Gasser), evidence of a differentiation among nerve-fibers previously unknown has been obtained. It appears that in a single trunk there are at least three kinds of fibers as distinguished by rate of conduction. The great majority in the dog have the high transmission velocity commonly attributed to them: about 80 meters per second. A small number may conduct as slowly as 1 meter per second. Others are intermediate in this respect. It is suggested that impulses concerned with pain may be carried by the slow fibers; this would account for the delay experienced in feeling pain when a blow falls upon the skin. We know that the sense of touch is far more prompt.

An Artificial "Nerve."—Several years ago Lillie called attention to many points of correspondence between functioning nerves and a simple artificial model. This consisted of an iron wire immersed in nitric acid of a certain concentration. A film of oxide coated the wire and set a limit to the attack of the acid upon it. A slight break in the film at any point was followed by a rapidly progressing disruption along the wire with a momentary exposure of the metallic iron and a renewal of the film. There are electrical features common to this process in the coated wire and to nerve. In its latest form Lillie's model employs a wire of such composition that the recovery of chemical equilibrium after an upset is remarkably quickened. This has made it possible to use an endless conductor and have the "impulse" circulate along its course for an indefinite time. The recovery of the wire thus suggests what takes place in a fibrillating heart where the wandering activity comes constantly upon regions ready to continue it. One also recalls in this connection the curious experiment of Parker who contrived to set a wave of contraction traveling around the margin of a jelly-fish under conditions which precluded a "back-fire" effect and reckoned that the wave proceeded for about 450 miles before dying out.

Sleep.—Evidence is advanced (Hess) which makes it appear that sleep is not the result of general depression of the nerve-centers in consequence of fatigue. The restraint, it is claimed, is imposed upon many of these centers by a definite activity localized in other parts of the brain. The stations from which influences are radiated to induce sleep are held to be placed deep in the interior of the organ and near the third ventricle. This belief is supported by experiments of a spectacular type. Cats have had electrodes permanently implanted in the depths of the brain and have recovered normal condition while carrying these appliances. An animal so equipped can be subjected at any time to mild electrical stimulation of the submerged centers. The effect is extraordinary: the cat shows all the signs of drowsiness, seeks a convenient corner, curls up and goes to sleep.

Emotional Behavior.—Fulton has shown that cats become very excitable after certain operations on the brain. This is most distinctly the case when paths connecting the frontal region of the cerebrum with the thalamic centers have been severed. Previous workers (among them Bard) had found that animals deprived of the cerebrum but retaining the thalamus—the part next below—became very irritable. The observations of Fulton, therefore, suggest that in the normal animal a restraining influence is exerted by the frontal centers upon the activities of the thalamus.

DIGESTION AND DIET

The Digestive Tract.—Under ordinary conditions the secretions of the digestive glands are not lost to the body but quite completely absorbed. How important this is may be appreciated in the light of a study made by Dragstedt. He has operated on the stomachs of dogs in such a fashion as to drain them permanently to the exterior. Death has regularly followed the total loss of gastric juice over a period of 5 to 8 days. The disturbing factor is doubtless the withdrawal of hydrochloric acid which results in a progressive reduction of the chlorides of the blood with a shift in the direction of alkalosis. Intravenous injection of Ringer's solution (replacement of chlorides) has considerably prolonged life in such animals.

Reference may be made to some experiments which are in a way the converse of the above since they emphasize the retention rather than the loss of secretions. Burget has set aside and closed off intestinal loops several inches in length, at the same time restoring the continuity of the canal. Precautions have been taken to guard against peritonitis and to keep down pressure in the isolated segments by occasional tapping. The situation has been well borne. It is concluded that an isolated sac retaining its secretions, and unsterile does not necessarily undermine health. Either there is little absorption of toxic material or the system rapidly gains an immunity.

Carnivorous Diet.—Two Arctic explorers, accustomed to Eskimo food, have recently lived for a year in New York on an exclusive meat diet. Excepting tea no vegetable matter entered into the ration. The foodstuffs were taken in about the following proportions: 100-135 grams protein, 175-250 grams fat, and only 5-10 grams carbohydrate. There was a technical acidosis as shown by the excretion of acetone bodies but there was no depression of physical fitness. The supply of calcium was deficient but no definite harm was apparent within the period of observation. Blood pressure was not raised.

Coffee Drinking.—This is a matter of such practical interest that numerous studies of it have been undertaken. The report made by Hawk at the Congress was remarkable for the large number of subjects (100 young men) who were utilized. Individuals who had previously not taken coffee were given two to six cups a day. The period ran to weeks or months. There were no circulatory disturbances of any moment though some acceleration of pulse and the sensation of palpitation were occasionally noted. Digestion was not seriously affected; changes in the reaction of the tract were as often in the direction of constipation as diarrhea. Stimulation of kidney activity was mild in degree. Nervous effects were much more pronounced. As would be expected the outstanding symptom was insomnia. Actual wakefulness or fitful sleep with disturbing dreams might be experienced. Other nervous effects included headache, tremor, dizziness and inability to concentrate. Reaction-time was generally prolonged and there was a falling off in the power to calculate rapidly and accurately. These results, on the whole, are less favorable to the advocates of coffee drinking than some earlier findings have been. Perhaps they represent the reactions of the system to excessive rather than optimal quantities of caffein.

Smooth Muscle.—The contractile tissue of the alimentary canal and other hollow viscera has always given impressive evidence of economy in performance. In particular there has been a mystery concerning its ability to resist distending forces for long periods of time. Some writers have urged that smooth muscle must be quite unlike skeletal in various fundamental respects, On the other hand Bozler has found that the two tissues have much in common. In both the heat attending contraction is nearly the same as that evolved during recovery in oxygen. Yet it is true that smooth muscle can maintain a contracted state with a small and diminishing consumption of fuel. This condition is compared by Bozler to that of skeletal muscle when moderately fatigued. Such muscle is characterized by a slow relaxation. Thus, paradoxically, it can support a certain weight more economically when fatigued than when fresh. It is perhaps this property which is developed to a high degree in smooth muscle.

BLOOD AND CIRCULATION

In this field may be noted the work of Garrey on leucocytosis. Very numerous observations have thrown new light on the circumstances which increase the number of white cells in human blood. Contrary to tradition no rise is found to accompany digestion. A far more important influence is that of muscular activity; even passive changes of position raise the count. Similar effects follow painful or emotional experiences. All the data favor the conclusion that the extra cells appearing in the blood of the skin have been displaced from vascular areas in which they had been stagnated. Hartman has reported a long series of reactions on the part of capillaries, emphasizing anew that these minute vessels are truly living and no longer to be regarded as passive parts of the circulatory apparatus.

Case histories presented by Rowntree serve to show how marked is the influence of the local circulation on tissue. Severe arthritis of the extremities has been relieved by the removal of the sympathetic ganglia associated with the regions involved. It is inferred that the disordered condition of the joints was associated with an undue constriction of the small blood-vessels. Improvement has followed the relative paralysis of these vessels with a more liberal blood flow in consequence.

Heymans has shown that the reflex regulation of blood pressure depends to a great extent on the properties of a certain very limited part of the arterial approach to the brain,—the carotid sinus. This segment is remarkably sensitive to pressure changes. An increase at this spot is followed by cardiac inhibition and extensive dilatation of vessels, tending to correct the disturbance. Lowering the pressure in the carotid sinus enlists all the resources of the system to bring it up again. There is vasoconstriction, acceleration of the heart, and contraction of the spleen. Adrenal discharge occurs, reinforcing all these adjustments.

THE LUNGS

It is generally taught that breathing is regulated by the chemical changes affecting the brain centers rather than by the nature of the gases actually in the lungs. It is probably true that the great sensitiveness of the brain cells makes them the chief seat of such stimulation in life. But a Spanish investigator (Pi-Suñer) has found that when constant conditions are maintained in the medulla evidence can be had of pulmonary response to carbon dioxide. An elaborate technique has made this demonstration possible: the blood supply to the head of the dog under observation has been furnished by a second animal. With this condition the only variables in the trials were experimental changes in the gas mixtures administered to the first dog.

Much is published in these days with respect to carbon dioxide as a respiratory stimulant. Its use in resuscitation and in hastening recovery from anesthesia is familiar. Among the papers presented at the Congress is one by Coryllos which stresses the value of this gas in experimental pneumonia. Dogs were infected with a virulent culture of pneumococcus. Their recovery was clearly dependent in many cases on the inhalation of carbon dioxide, 5- per cent. The favorable effect is due to the vigorous breathing movements induced, with a thorough opening of regions of the lung in which consolidation is tending to set in.

THE ADRENAL

The significance of this organ is still under discussion, Cramer has described methods of microscopic study which can be applied to its cells and which give visible evidence of the extent to which the active agent is stored or discharged. He finds that exposure to cold causes the cells to part with epinephrin. Prolonged stimulation of the gland with corresponding delivery of its internal secretion to the blood elevates the body temperature. It is the opinion of another contributor, von Euler, that the adrenal may have to do with fever.

HIGH-FREQUENCY VIBRATIONS

Harvey has performed experiments of extraordinary interest on the effect of vibrations more rapid than those of audible sound upon cell structure. The waves are thrown off by a quartz crystal agitated by a rapidly oscillating electric field. They reach frequencies of 300,000 to 2,500,000 per second. Such waves may have stimulating effects on excitable tissues. On isolated cells they act destructively, laking blood, cytolyzing egg-cells and infusoria and sterilizing bacterial cultures.

PLANTS AS PHARMACOLOGICAL REAGENTS

For ages physicians have used drugs of vegetable origin and gained a detailed knowledge of their influence upon the human system. It has remained for Macht to show that there is a great field complementary to the traditional one, that of the reaction of plants to animal products. Plants are found to be surprisingly sensitive to animal metabolites. An extremely slight change in the nature of blood serum may render it toxic to plants. For example, blood from cases of pernicious anemia has a retarding effect on the growth of seedlings, a property not found in normal blood nor in certain other blood diseases. In several pathological conditions the behavior of plants toward the blood may have a suggestive if not a diagnostic significance.

PATHOLOGY

BY A. JAMES MILLER
PROFESSOR, UNIVERSITY OF LOUISVILLE

ETIOLOGY OF NEOPLASMS

The etiology of tumors is unknown. This fact should be kept in mind in any discussion concerning the subject, even though at the present time we have a number of theories that are founded on experimental work which indicate that we may have direct knowledge as to some of the factors which are of great importance in bringing about that dreaded disease. Time will only tell as to whether these are correct or not. Among them, and perhaps of prime importance, is individual susceptibility, and this may be inherited. This condition is comparable to the fact that certain races and even families, or strains of individuals, are particularly susceptible to certain diseases. For instance, the Negro and the American Indian are particularly susceptible to tuberculosis, but they acquire it readily only under certain conditions; and so it is believed that strains of individuals have inherent in their tissues certain conditions which make them more susceptible to tumor growth if the other factors are brought into their environment.

In some tumors cell rests seem to be very important in their production, but even these cell rests are possibly the result of cell environment which is prenatal. One of the chief characteristics of tumors is that they have unusual powers of growth. The stimulus which brings this growth about has been very elusive. It is known that in both normal and neoplastic tissue trauma will, in some way, excite cells to multiply. The changes or intermediate steps between trauma and cell division have not been understood. But working with this idea in mind, tumors have been produced by chemical irritations, radium and *x*-rays. The production, however, was not understood except that it seemed that these chemical irritations produced tissue injury resulting in proliferation until finally this type of proliferation exceeded the bounds of normalcy and continued in neoplastic fashion rather than normal fashion.

Two years ago it was pointed out that this stimulus was probably a common factor, but simply produced in the different methods which are known to produce experimental tumors. This year work by Hammett has pointed out the influence of the sulphydryl group (SH.) as this stimulating factor. It was suggested to him because of the fact that lead does combine with substances containing this group, therefore making them inactive. Upon investigation this radicle was found abundant in the chemical substances,—for instance, coal tar—and some of the parasites which are known to produce tumors. It, of course, follows from this that the removal of the sulphydryl group would be very important in the prophylactic treatment of neoplastic disease. It remains, however, that this group is not believed to be the sole etiological factor, that accompanied with it must be other constitutional factors consisting of heredity tendency, cell autonomy and internal secretion in order that the disease might be produced. The influence of trauma in producing tumor growth is being emphasized less and less. Knox points out that the trauma of war has not demonstrated it and that all histories of the relation of trauma to tumor appearance are questionable. It is also believed that trauma alone does not accelerate tumor growth as once believed.

VITAMIN "A" DEFICIENCY

Tissue changes resulting from Vitamin A deficiency have been more clearly understood as the result of work of Tyson and Smith in that they described the sequence in which different tissues of the body (rats) are affected. Naming the tissues in order of their susceptibility, they are: sub-lingual gland, sub-maxillary glands, renal pelvis, trachea and bronchi. This is in keeping with former teaching that all of the tissues of the body are not equally susceptible to the same environmental influence, whether it be vitamin, or endocrine, or toxin, or simply food. After supplying the missing factor in the diet, the process is arrested and improved, though not completely recovered. An accompanying infection which is so constant in vitamin deficiency disease is apt to continue and remain chronic after the tissue changes resulting from deficiency have been arrested.

IODINE AND THE THYROID GLAND

At this time it seems we can quite definitely say that iodine causes proliferation of the gland cells in the thyroid. This was shown by Rabinovitch who based his opinion on counting the number of cells which were multiplying at various times after the administration of iodine in different quantities to animals. This has been repeatedly pointed out by Loeb, who states that the administration of iodine also enhances the compensatory hypertrophy of the thyroid in animals that have had part of their gland removed by surgical procedure. The same author indicates that other endocrine glands have an influence on the compensatory hypertrophy of the thyroid so that the tissue changes in this gland are quite certainly not simply the result of their relation to iodine. Anterior pituitary substance, thyroid substance and thyroxin all depress the compensatory hypertrophy of the thyroid gland and produce changes in it that signify an arrested condition.

METAPLASIA

The observations of previous scientists indicate that the changes of one type cell into another under the conditions of emergency are again confirmed by Higgins & Palmer. They observed a change from lymphocytes of the blood stream to fibroblasts or the common connective tissue cells in isolated blood clots. This perhaps would help to explain the abundance of lymphocytes in old chronically inflammatory lesions or in any condition in which a great amount of connective tissue repair is necessary.

REFERENCES

Hammett, F. S., *Arch. of Path.*, VIII, 575.

Higgins, P. M., and Palmer, B. M., *Arch. of Path.*, VII, 63.

Knox, L. C., *Arch. of Path.*, VII, 272.

Loeb, L., *Am. Jr. Path.*, V, 79.

Loeb, L., *Am. Jr. Path.*, V, 71.

Rabinovitch, J., *Am. Jr. Path.*, IV, 601.

Tyson, M. D., and Smith, A. H., *Am. Jr. Path.*, V, 57.

MEDICINE

By Russell L. Cecil

Assistant Professor of Clinical Medicine, Cornell University

PNEUMONIA

Type IV Pneumococci.—Several important advances have been made in the bacteriology and treatment of pneumonia during 1929. Cooper, Edwards and Rosenstein of the New York City Health Laboratories have made some interesting observations on the so-called Type IV pneumococci. It has long been known, of course, that this group of pneumococci were not biologically identical. Park and

Cooper, however, have segregated more than fifty percent of these strains into ten new and distinct biological groups. The remaining fifty percent are still classified as "miscellaneous." Some of these new biological groups are instrumental in the etiology of pneumonia with a fair degree of frequency. Indeed some of them are more commonly encountered than Type III pneumococci. The significance of this work lies in the fact that by virtue of the more accurate classification of group IV pneumococci, a new field for serum therapy is opened up. Horses are now being immunized against these new biological types, and it is to be hoped that before another year has passed some of these serums will be ready for clinical use.

Serum Treatment.—During the past year important advances have been made in the serum treatment of pneumonia. By refining antipneumococcus serum according to the method of Felton, serum can now be administered in a concentrated form, which is much more practical for private practice. Furthermore, the serum reactions are less severe than with the unrefined serum. Cecil and Sutliff have recently reported a large group of pneumonias treated by Felton's serum in the wards of Bellevue Hospital. The serum was given to alternate cases in order to have an untreated group for comparison. In pneumococcus Type I pneumonia the death rate in treated cases was one third less than for the untreated cases. In Type II infections, the death rate was cut about one fourth in the serum-treated group. When Type I patients were treated early, however, the death rate was cut almost two thirds, thus indicating the importance of early treatment. Park, Bullowa and Rosenbluth have also reported a large group of patients treated with Felton's serum in the wards of Harlem Hospital. These investigators also use the alternate case method of studying the effect of the serum. The results obtained were very similar to those reported by Cecil and Sutliff. The death rate for both Type I and Type II pneumonia was considerably lower in the serum-treated cases than in those that received no serum.

Oxygen Treatment.—During the past year, the use of oxygen in the treatment of pneumonia has continued to grow in popularity. Indeed, the rational method of treating cyanosis in pneumonia is by the efficient administration of oxygen. It has been shown that the old-fashioned funnel method of giving oxygen is practically useless, because so much is lost into the atmosphere. It has been shown that the inhalation of forty to sixty percent of oxygen in the inspired air raises the arterial saturation to or near the normal level in the majority of patients exhibiting anoxemia, and with this rise there are definite signs of improvement in the patient. In a recent series of one hundred severe cases of pneumonia treated in an oxygen chamber or oxygen tent, Barach has noted the following beneficial effects due to the inhalation of oxygen: 1. Disappearance or diminution of cyanosis; 2. Slowing of pulse with corresponding improvement in quality; 3. Slowing of respiratory rate; 4. Decreased delirium and restlessness; 5. Subjective improvement.

In some cases oxygen treatment appeared to prolong life until the patient developed an immunologic resistance to the disease. It is of interest that the presence of bacteremia, even in an oxygen-treated series, is associated with a high mortality. Thus, in the fatal cases, 46 percent had positive blood cultures, whereas in the recovered cases, 17 percent had positive blood cultures. The importance of sterilizing the bloodstream wherever possible is again emphasized.

The treatment of oxygen deficiency is ideally carried out by the oxygen chamber as used by Stadie, Barcroft and Binger, where an oxygen room encloses both patient and nurse. A new type of oxygen chamber with a simplified ventilating mechanism has been developed by Barach. Portable oxygen tents are now employed in many hospitals. The Roth-Barach tent encloses the head and chest of the patient, supplying forty to sixty percent oxygen in an atmosphere air cooled and dried by direct passage over ice. The nasal catheter used in conjunction with high-pressure oxygen and a calibrated reducing valve is the best method for routine treatment both in the hospital and in the home. If 2.0 litres per minute are administered through a single catheter, the inspired air contains thirty percent oxygen. With a double catheter, 5.0 liters of oxygen may be administered, the inspired air containing approximately 38 percent oxygen (Barach). If at the terminal one inch of the catheter is perforated with six small holes, these high rates of flow are usually well tolerated. The old-fashioned funnel method of giving oxygen is practically useless.

CHRONIC ARTHRITIS

For many years investigators have suspected that rheumatoid arthritis was an infectious disease. Indeed, since the work of Billings on focal infection, many physicians have spoken of chronic deforming arthritis as chronic infectious arthritis. The organism most frequently associated with the infection has been some form of streptococcus, but isolation of streptococci from lesions has been so rare that the streptococcal theory has never been accepted. During the past year considerable evidence has been accumulated that chronic infectious arthritis is an infectious disease caused by some form of streptococcus. Forkner, Shands and Poston studied the synoviol fluid in 63 patients with chronic infectious arthritis and obtained positive joint cultures in 22 percent of the total number of cases. Eleven yielded streptococcus viridans; two, gonococcus; and one staphylococcus aureus. Poston has recently corroborated the earlier work of E. C. Rosenow by isolating streptococci from glands removed from patients with chronic infectious arthritis. She obtained positive cultures from 72 of 120 glands, and 93 percent of the organisms isolated were streptococcus viridans. Perhaps the most convincing evidence for the streptococcal nature of chronic infectious arthritis is that supplied by Cecil, Nicholls and Stainsby, who succeeded in isolating streptococci from the circulating blood in 61.5 percent of a series of 78 patients with chronic infectious arthritis. Of these streptococci, 83.3 percent were culturally and biologically identical, and appeared to be attenutated hemolytic streptococci. This dominant strain was referred to as the "typical strain." The remaining strains fell definitely into either the viridans or the indifferent group of streptococci. A streptococcus, culturally and biologically identical with the strain isolated from the blood could sometimes be cultivated from one of the affected joints in the same patient. A streptococcus, culturally and biologically identical with the strain isolated from the blood and joints, could sometimes be isolated from a focus of infection in the same patient. When the "typical strain" of streptococcus was injected intravenously into rabbits, a majority of the rabbits developed a chronic nonsuppurative polyarthritis. Microscopically, the histologic changes in the rabbit's joints were practically identical with those observed in the joints of patients with chronic infectious arthritis. Cultures from the blood and from the joints of rabbits infected with experimental arthritis frequently yielded a streptococcus identical with the strain originally injected.

HYPERPARATHYROIDISM

A new clinical syndrome has been described which appears to be characteristic of functional overactivity of the parathyroid glands. In most of the reported cases of this condition the symptoms pertain chiefly to the renal, gastro-intestinal, osseous and muscular systems. The renal symptoms consist of polyuria, a heavy urinary precipitate and occasional cystitis or nephrolithiasis. Further symptoms are loss of appetite, nausea and vomiting, abdominal pain and constipation. All the patients have had difficulty in walking, partly due to muscular weakness, but chiefly referable to changes in the bones, such as bowing of the long bones of the legs or spontaneous fractures. The most constant change in the bones, as shown by the x-rays, was diffuse rarefaction, a picture almost identical to that seen in osteitis fibrosa, although in many ways resembling osteomalacia. In four of the six reported cases, exploratory operations were performed and the diagnosis of parathyroid adenoma was established. In each case the serum calcium was elevated above the normal level. The values recorded ranged from 13.1 to 20.75 mg. per hundred cubic centimeters. The serum phosphorus was low in the two cases in which it was estimated. The most recent of these studies on clinical hyperparathyroidism is that of Boyd, Milgram and Stearns, and perhaps the most interesting point brought out by their report is that in each of the four cases in which a parathyroid adenoma had been diagnosed at operation, the removal of the adenoma resulted in definite relief of symptoms.

RHEUMATIC FEVER

Although thirty years have elapsed since streptococci were isolated by the English investigators, Poynton and Paine, from the lesions in rheumatic fever, there still remains considerable doubt as to the etiology of this disease, chiefly because other investigators have not been so successful in recovering streptococci from the blood and joints in this condition. During the last year or two, however, there has been a distinct swing back toward the acceptance of the streptococcus as the exciting agent of inflammatory rheumatism. This trend has been hastened by the work of Small and Birkhaug, who claimed to have found a specific streptococcus in the throats of patients suffering from rheumatic fever. It has received additional impetus from the recent studies of Clawson, who isolated streptococci from the blood in a considerable number of patients with rheumatic fever. Furthermore the studies of Swift, Zinsser and others on the presence of a streptococcus hypersensitiveness in the rheumatic-fever patient has done a great deal to stimulate interest in this phase of the problem and has again focused the attention of investigators on the streptococcus in its relation to rheumatic diseases. By using a special technique, Cecil, Nicholls and Stainsby have recently reported the isolation of streptococci from the blood and joints in a high percentage of patients with rheumatic fever. Only those presenting actual joint involvement were studied. In a series of 60 cases of rheumatic fever with arthritis, streptococci were recovered from the blood stream in 35, or 58 percent, of the series. In seven patients with rheumatic fever, five or 71 percent, yielded a streptococcus from joint cultures. All but two of these strains of streptococci were classified as alpha streptococci (streptococcus viridans). Agglutination and absorption tests indicated that the strains of streptococcus viridans recovered from these patients showed a tendency to fall into several biological groups. From these experiments the authors conclude that rheumatic fever is almost certainly a streptococcus infection, usually of the alpha or viridans type, and that the joint manifestations are primarily dependent upon the localization of streptococci in the joint with subsequent infection.

BIBLIOGRAPHY

COOPER, G., EDWARDS, M., and ROSENSTEIN, C. "Separation of Types among Pneumococci Hitherto Called Group IV and Development of Therapeutic Antisera for These Types." *J. Exper. Med.*, (Mar.) 1929, 49:461.

CECIL, R. L., and SUTLIFF, W. D. "The Treatment of Lobar Pneumonia with Concentrated Antipneumococcus Serum," *J. A. M. A.*, (Dec. 29) 1928, 91:2035.

PARK, W. H., BULLOWA, J. G. M., and ROSENBLUTH, M. B. "The Treatment of Lobar Pneumonia with Refined Specific Antibacterial Serum," *J. A. M. A.*, (Nov. 17) 1928, 91:1503.

BILLINGS, F. "Chronic Focal Infections and Their Etiologic Relation to Arthritis and Nephritis," *Arch. Int. Med.*, 1912, 9:484.

FORKNER, C. E., SHANDS, A. R., and POSTON, M. A. "Synovial Fluid in

Chronic Arthritis," *Arch. Int. Med.*, (Nov.) 1928, 42:675.

Poston, M. A. "Gland Cultures in Infectious Arthritis," *J. A. M. A.*, (Aug. 31) 1929, 93:692.

Rosenow, E. C. "Etiology of Arthritis Deformans," *J. A. M. A.*, (Apr. 11), 1914, 62:1146. "The Newer Bacteriology of Various Infections as Determined by Special Methods," *J. A. M. A.*, (Sept. 12) 1914, 63:903.

Cecil, R. L., Nicholls, E. E., and Stainsby, W. J. "The Bacteriology of the Blood and Joints in Chronic Infectious Arthritis," *Arch. Int. Med.*, (May) 1929, 42:571.

Boyd, J. D., Milgram, J. E., and Stearns, G. "Clinical Hyperparathyroidism," *J. A. M. A.*, (Aug. 31) 1929, 93:684.

Poynton, F. J., and Paine, A. "Etiology of Rheumatic Fever," *Lancet*, 1900, 2:861.

Small, J. G. "The Bacterium Causing Rheumatic Fever and a Preliminary Account of the Therapeutic Action of its Specific Antiserum," *Amer. J. Med. Sc.*, 1927, 173:101.

Birkhaug, K. E. "Rheumatic Fever: Bacteriologic Studies of a Non-Methemoglobin Streptococcus with Special Reference to Its Soluble Toxin Production," *J. Infec. Dis.*, 1927, 40:549.

Clawson, B. J. "Studies on the Etiology of Acute Rheumatic Fever," *J. Inf. Dis.*, 1925, 36:444.

Cecil, R. L., Nicholls, E. E., and Stainsby, W. J. "Bacteriology of the Blood and Joints in Rheumatic Fever,"*J. Exper. Med.*, 1929, 50:617.

PHARMACOLOGY

By Harry Gold

Cornell University Medical School

PITUITARY PRINCIPLES

Extracts of the posterior portion of the pituitary gland produce a number of pharmacological actions among which the most important are the oxytocic, the pressor, and the diuretic-antidiuretic actions. As the result of numerous researches several theories have been postulated concerning the nature of the substances responsible for these actions. At one time it was held that a different chemical agent was involved in the case of each of the different actions, and in recent years Abel and his co-workers have supported the theory that one and the same substance caused all three actions, and they were able to obtain this substance purified to an extraordinary degree of activity. In the past year however, brilliant chemical investigations have thrown new light on the active substances of the pituitary gland. Kamm and his associates have shown that the posterior portion of the gland contains two important principles; one responsible for the oxytocic action, the other for the pressor and renal actions. They succeeded in separating these two substances and prepared them in a concentrated powder form. This work has been awarded the $1000 prize for the most meritorious research for 1929 by the American Association for the Advancement of Science.

BLOOD PRESSURE

Epinephrine.—For many years it has been held that the subcutaneous injection of epinephrine causes very little, if any, rise in blood pressure. This view was based mainly on observations in anesthetized animals. From time to time reports have appeared in the literature, showing that in man considerable elevation of the blood pressure may occur under given conditions following this mode of administration of the drug. That man is capable of absorbing epinephrine from the subcutaneous tissues is evident from the fact that a small dose given in this way raises the blood sugar in a few minutes, or may relieve an attack of bronchial asthma in two or three minutes in a very spectacular manner. Since the drug is often used in disturbances of considerable duration or with tendencies to recurrence, its usefulness is limited by the fact that its action is very brief, and it is necessary to give repeated injections to maintain relief of symptoms.

Massage Application.—The recent work of the Chicago pharmacologists, Luckhardt and Koppányi, is therefore of great practical interest in that they showed that massage of the area into which epinephrine has been injected subcutaneously causes a marked rise in blood pressure. This effect of massage can be repeated for many hours after the injection. The phenomenon has been studied in man by Koppányi, Lilienthal and others, and gives considerable promise of enhancing the clinical usefulness of epinephrine. For those suffering from frequent recurrent attacks of asthma or urticaria requiring three or four injections of epinephrine daily to relieve the symptoms, it is well to know that a depot of epinephrine may be established under the skin from which the drug can be introduced into the blood stream from time to time by merely massaging the area of injection.

Watermelon—Seed Extract. — A glucoside has been isolated from the seed of the watermelon (Cucurbita Citrullus) by Barksdale in 1926 which he named cucurbocitrin. He found that this substance lowered the blood pressure and reduced capillary pressure in animals as well as in man. Several observers (Wilkinson, Alhausen and Kerr) have recently reported clinical studies showing that in certain cases of hypertension rather striking and persistent reduction in the blood pressure can be produced. In the doses used (about 50 milligrams by mouth three times daily) no toxic symptoms have been observed. The treatment of hypertension by drugs is still in a very unsatisfactory state, and there is need of great caution against unwarranted enthusiasm over new remedies. The recent reports on watermelon seed show that this drug may prove to be a valuable addition to the measures that are now employed in the treatment of hypertension.

SUPRARENAL EXTRACTS

That the suprarenal glands are essential to life has been known about 75 years (Addison's description of a disease involving these glands in 1855, and Brown-Sêquard's discovery the following year that animals die after the glands are extirpated). About 40 years later, Oliver and Schäfer discovered the pressor action in an extract of the glands which subsequently proved to be due to epinephrine. For several years it was believed that epinephrine was the essential constituent of the glands, but more recently it has been found that epinephrine would not support life if the glands were extirpated, and also that animals would frequently live if the medulla of the organs which contains the epinephrine was removed. Animals would invariably die, however, if the cortex was extirpated. The cortex, therefore, proved to be the factor essential to life. Attempts were made to treat animals with extracts of the adrenal cortex and some success was attained in prolonging the life of adrenalectomized animals by Hartman of Buffalo, and Rogoff and Stewart of Cleveland. The results were somewhat confused, however, by the fact that the early extracts contained some epinephrine. More recent researches have succeeded in producing active extracts from the adrenal glands free from ephinephrine. Such an extract has been described by Hartman and his associates, who were able to keep cats alive for nearly a month instead of 5 or 6 days after the removal of the adrenal glands, by the daily injection of this substance which they called Cortin. Koehler and Eichelberger of Chicago have also described a method for the preparation of an epinephrine-free substance from the suprarenal capsule capable of increasing basal metabolism and improving certain types of clinical asthenias.

ANAEMIA

Liver Extract Standardization.—Torrey and Kahn of the Department of Public Health and Preventive Medicine, Cornell University Medical College, have succeeded in developing a test which may prove valuable in the standardization of liver extracts now widely used in the treatment of pernicious anaemia. These investigators find that a small dose (½ cc.) of a potent B. welchii toxin will, when injected into the tibial marrow of rabbits, give rise to a chronic and progressive anaemia, which, in a number of its aspects, is highly suggestive of pernicious anaemia. Further investigations by others have succeeded in showing that the feeding of liver extract to rabbits with chronic anaemia produced in this way is beneficial, resulting in a prompt and marked rise in recticulocytes, haemoglobin and red cell counts. There seems also to be a proportionality between the amount of liver extract given and the increase in the number of red cells and haemoglobin content. The benefit, in fact, seems to parallel that occurring in pernicious anaemia patients on liver extract. These findings offer hope that a laboratory method for standardization of liver extracts may be thus established. It has lately been found, however, that all strains of the B. welchii may not be used in the production of toxin for this test. Best results are probably obtained with a strain freshly isolated from a pernicious anaemia case and known to produce a highly potent toxin.

TESTICULAR EXTRACTS

Considerable success has been attained in the past few years in the isolation of active substances from the female sex glands, the whole ovary, follicular fluid, and the corpus luteum. Attempts to obtain active extracts from the testes had met with very little success, until the work of Koch, Moore and Gallagher of the University of Chicago. They obtained lipoid extracts of the bull testes, which, when injected subcutaneously or intramuscularly into the brown leghorn capon, castrated rat and guinea pig, produced definite changes in the development of sexual organs and sexual activity. In the capon, growth of the comb, ear lobes and wattles were obtained, and in the other animals, effects of castration upon the prostate, seminal vesicals, and sperm motility were partly or wholly overcome. When these results were reported at the Thirteenth International Physiological Congress at Boston, several European workers in this field indicated that they may have had similar substances in their extracts, and that their negative results may have been due to insufficient dosage because extract corresponding to relatively very large quantities of the glands was found necessary by the Chicago workers to produce the effects.

OBITUARY

Loevenhart. — April 20, 1929, marked the death of Arthur S. Loevenhart, Professor of Pharmacology at the University of Wisconsin, and one of the foremost of American Pharmacologists. His scientific studies covered a wide range of subjects among which may be mentioned studies leading to the discovery of the reversal of enzyme action, on the mechanism of oxidation, on the absorption of fats, on the effects of oxygen on the respiratory mechanism, and the effects of low oxygen tension, on the arsenicals, the nitrites, and also on local anesthetics.

SURGERY

By Herbert H. Davis

Surgeon, Omaha, Nebraska

SURGERY AND THE PATIENT

Surgery is constantly being made more easy and comfortable for the patient. This is chiefly in the line of more careful diagnosis, preparing the operation along physiological lines, great improvement in anesthesia, and carrying out post-operative treatment on the basis of sound physiology. We are more and more trying to prevent distress and complications following operation by physiological measures to prevent trouble rather than waiting for the complications before treating them. The problem of anesthesia will be especially mentioned.

ANESTHESIA

Technic of Administrating.—General anesthesia by ether, nitrous oxide (sometimes called "laughing gas") or ethylene in the main hospitals is given by people specializing in anesthesia; and because of the improvement in the technic of administrating general anesthesia, there is much less postoperative vomiting and other distress. Even with these improvements, however, there are certain conditions in which other forms of anesthesia are advisable. These methods may be by local nerve block with novocaine, sacral block, spinal anesthesia, rectal injections, and giving the agent intravenously.

Spinal anesthesia has been used for many years. Years ago the serious accidents from that source were many and so it was practically discarded. Recently it has again found favor, and now has very slight danger, if properly given. The physiology is much better understood and the drugs now used are much less toxic. The spinal puncture with the ordinary technic of any spinal puncture used for diagnosis is done, a little spinal fluid being withdrawn. In some cases the crystals of the anesthetic agent are dissolved in the patient's own spinal fluid and reinjected. In others a solution already made up is injected. This paralyzes the nerves coming from the spinal cord, below the area reached by the injected fluid. The fluid naturally reaches considerably higher than the point injected as it runs up and down in the canal. With its use complete anesthesia is obtained easily for the abdomen, pelvis, and lower extremities. The anesthesia is much more complete than locally blocking the nerves in the abdominal walls as it also anesthetizes the nerves leading to the internal organs.

Organic Reactions.—The sympathetic nerves connected with the spinal cord are anesthetized below the level reached by the injected fluid. This results in certain changes, involving the rapidity of the heart beat, peristalsis of the intestinal tract and the tonicity of blood vessels. Sympathetic nerves accelerate the heart rate. Therefore, their paralysis causes slowing of the heart. The paralysis of the sympathetics to the intestines causes increased movement; because of this, distension is greatly reduced and sometimes even mild degrees of intestinal obstruction relieved and postoperative distension decreased. In paralyzing the nerves to the blood vessels, the vessels dilate and the blood pressure is greatly reduced. This low blood pressure, if the patient's head is not lowered, may cause anemia of the brain and serious complications. However, this is easily avoided by having the operating table slanting in such a way that the head is lowered. The danger of this form of anesthesia is somewhat debated, but if given correctly should be very slight. It is especially indicated in diseases of the lungs and heart, which would contraindicate general anesthesia; also, in paralytic conditions of the bowel and in amputation of an extremity, especially in those due to diabetes.

Amytol.—There have been many articles this year on anesthesia by intravenous injections of amytol. By injecting the proper amount of this intravenously the patient goes to sleep and may remain so for hours or even days. It is too new to say much on its dangers or to state its indications. Therefore, it is seen that while general anesthesia is the most commonly used form, that there are many other satisfactory methods in case it is contraindicated in any particular patient.

RAYNAUD'S DISEASE

Raynaud's disease is spasm of the arteries of the extremities which leads to decreased blood supply and finally to gangrene. It is usually bilateral and may affect the arms or legs. Young women are especially affected. There is tingling, burning and paroxysms of pain in the extremity. Addison and his co-workers are treating Raynaud's disease by resecting the sympathetic ganglia and trunks leading to the extremity involved. The theory is that this operation relieves the spasm of the vessels, thus admitting no blood to the parts. They have reported a small number of patients with this treatment, some of them with very striking beneficial results. In this, too, the time elapsed has not been long enough and the number of cases not large enough to yet draw definite conclusions.

DENTISTRY

By Harold J. Leonard

Professor, Columbia University

CRITICAL ANALYSIS

The year 1929 is remarkable in the field of dentistry, not so much for new scientific discoveries or developments in practice, as for a spirit of unrest which seems to permeate dental society, a spirit which is to be noted at all dental meetings, a feeling that all is not right with dentistry and that new and revolutionary developments are imminent.

There are a variety of causes for this feeling. American dentistry is being challenged on all sides and from within. The apprehension is growing that technical reparative dental service which has been developed to such a high point and of which American dentists are so proud, is not enough. Responsibilities have developed for dentistry which cannot be met by present practices and dentists are coming to realize that they are unprepared in other ways to meet them.

SPECIFIC POINTS OF CRITICISM

Among the criticisms which are leveled at dentistry are the following: 1. Many systemic ills are attributable to disease in and about the teeth and the dentist is not now prepared to coöperate competently in their treatment; 2. Dental disease is undoubtedly very largely due to underlying systemic conditions which the dentist is in no wise at present prepared either to discover or to treat; 3. The elimination of dental disease from humanity is the particular province of dentistry but in spite of the efforts of dentistry the common dental diseases are more prevalent than ever, and very little progress has been made in many years in discovering the causes of susceptibility or in the means of prevention; 4. As dentistry is organized the cost for dental service, namely reparative and restorative treatment, is so great that not over twenty per cent avail themselves of it, and already labor unions and other organizations are attempting the management of dental clinics to bring service to their members at fees they can afford, which are in line with proposals of socialized or state dentistry heard from time to time in legislative halls, causing alarm in many sections of dental society; 5. Dental laboratories and quack practitioners claim that they are able to train men in a year or two for the technical procedures of dental repair and are clamoring for the legal right to train and license operators for this purpose, their argument being they would thereby fill a public demand by giving dental service at a lower cost than is possible by present day dentists who necessarily have a much more prolonged and expensive education.

Remedial Plans.—These criticisms and others that are coming from economists, educators, editorial writers, physicians, dentists, and others have made the leaders of thought in dental practice and education vividly conscious of the present shortcomings and have started agitations for various remedies. What is needed is a thorough study of the whole problem of the economics of dental practice and education, in other words a job analysis, by some one capable of doing it in a thoroughly competent and objective manner. Dentistry is at the point where wise planning for its future is the prime requisite. Plans for such a survey were undertaken by the

American Association of Dental Schools at its meeting in March, 1929. In line with this projected study is a series of informal conferences being held at Columbia University two or three times a year in which a group of educators of the East who are interested in an objective analysis of this problem meet to discuss it. This group is frankly facing the issues involved and discussing the possibilities of raising dental education to a position where graduates would be trained and licensed to handle competently the medical and biological as well as technical aspects of dental practice. This would make dentistry actually a branch of medicine. While such a plan has obvious advantages it has certain disadvantages for giving needed reparative and restorative service economically. To meet this objection it is proposed to train workers in relatively short periods for various phases of dental technique, and license them to operate only under the supervision of fully trained dentists.

MEDICAL TRAINING FOR DENTISTS

Of great significance in the direction of medical training for dentists is the inauguration at the medical schools of Yale and Rochester Universities of departments dealing with oral diseases and deformities. These schools are attempting to teach their medical students what should be known about teeth from a medical standpoint. The unique thing is that they are also taking selected dental graduates of other institutions as paid fellows for training to complete the medical course. They are thus taking a first step in making dental education and practice a regular department of medical education and practice.

Of interest also is a plan proposed at the University of California to train orthodontists especially for their work without taking the whole training in dental technology. This is perhaps the first step in a plan by which the special field of medical practice, dentistry, will be subdivided into orthodontia, oral surgery, restorative dentistry, preventive dentistry and periodontia, and perhaps others, each with a special education based on a common foundation of medical and dental science, the differences being in technical training.

COMMUNITY DENTISTRY

Dental Clinics.—The year has been marked with some very outstanding developments in community dentistry. Among these was the announcement in June by the Murry and Leonie Guggenheim Foundation of their plan for the building and endowing of a series of dental clinics for the children of New York City, the first unit costing three to four million dollars to be situated in mid-Manhattan and to be started immediately. In April the cornerstone was laid of the new $1,000,000 Eastman Dental Clinic, the gift of George Eastman of Rochester to the poor families of London. A similar clinic for Rome has been given by Mr. Eastman and will shortly be opened. During the year Julius Rosenwald announced a gift of $20,000,000 to be spent within a limited period for children's work, including an adequate dental program in Chicago.

In Chicago due to the foresight and public spirit of the leaders, the dental societies have taken the lead in the development of dental clinics in the community. This is in marked contrast to the medical profession of the city that has waged a bitter fight on the development of school and community clinics. The dental society by its enlightened attitude has done much to contribute to community dental service and is doing much to disarm the criticism directed against the professions, that while unable to give service themselves at costs the public can afford, they yet oppose the development of facilities that can give such service.

Cost of Dental Care.—The problem of the cost of dental care is being considered by the Committee on the Cost of Medical Care and the American Dental Association formally entered into coöperation in this study.

PROGRESS IN DENTAL SCIENCE

First Research Meeting.—Progress is being made in many lines in dental science. The development of interest in dental science during this year is perhaps more noteworthy than outstanding scientific achievement. The year marked the first meeting of the dental research men of the country, given over entirely for two days to reports of scientific progress.

Study of Dental Decay.—Among the matters receiving the most attention in dental research, the most outstanding is of course the attack on the causes and prevention of dental decay. This is being attacked from several standpoints: first, dietetic causes and prevention by dietary correction; second, bacterial causes and prevention by special germicidal agents; third, possible changes in tooth structure and the means of making enamel resistant; fourth, biochemical causes either in blood or saliva. Data is accumulating to show that dental enamel has a circulation and is not the inert, lifeless substance formerly supposed. This is focusing attention on nutritional and metabolic changes that may affect it from within. Some very interesting studies are being reported of groups of children under controlled conditions who have been rendered immune to dental decay by modification of the diet.

Gum Infection.—Another subject that is receiving much attention is Vincent's infection of the gums known during the war as Trench mouth. This disease is very prevalent since cigarette smoking has come into vogue and is sometimes very serious in its effects. Considerable progress is being reported in working out the life history of the microörganism, the pathology of infection by it, and modes of treatment.

Infection and General Health.—Further work is also being done on methods of treating root canals so that teeth with pulp involvements may be saved without danger to the general health. Along the line of the relation of infections in and about the teeth to secondary systemic diseases research work is going on in many places. The principle that chronic local infection about the teeth is one source of such systemic disease seems well established but just what systemic diseases may be caused or influenced by it, and just how such infections operate are still subjects for further study.

RESTORATIVE DENTISTRY

Turning to another phase of dental science, that of restorative dentistry, we find active research going on in metallurgy, and the physical properties of all dental filling materials. This study is most important in its relation to the efficiency and durability of dental restorations. A study is also being made of the relative efficiency of various types of grinding surfaces of denture teeth. While restorative dentistry in its best practice has reached a very high point of efficiency there is still much to be learned and new problems are constantly being raised as more is discovered concerning the biologic requirements. Even in what are apparently matters of pure technology, the scientific approach is being used in dentistry to good effect to the end that dental restorations may not only be mechanically perfect but also may tend to promote health in the mouth and be a source of comfort, beauty, and hygiene to the users.

PUBLIC HEALTH AND HYGIENE

By Ira V. Hiscock

Associate Professor, Yale University School of Medicine

WEST AFRICAN YELLOW FEVER

Research.—A comprehensive program of research is being steadily pushed forward by able men "who do not hesitate to face isolation, hardship, and danger for the sake of science and human welfare" (See the Rockefeller Foundation *Review*, 1929). While no specific causative agent for the disease has been found, knowledge concerning the virus has increased. The Indian monkey, Macacus rhesus, has proved invaluable as an experimental animal. The identity of African yellow fever with the American type is almost completely established. In Africa, at least, the *Aedes aegypti* mosquito is not the only means of transmission, as some of its related species are able to carry the infection.

Blood-Virus.—Certain tests seem to indicate that the virus in the blood may find its way through even the unbroken skin of a monkey or possibly of a man, and thus directly cause infection. Methods of preservation of the virus for storage for shipment between laboratories have been improved until it is now possible to desiccate blood-virus in the frozen state and keep it in sealed tubes for at least 150 days. Efforts to develop an immunizing agent look somewhat promising (*Amer. Jour. P. H.*, 1929, Sept., p. 1022).

HEALTH SUPERVISION

The School Child.—Exhaustive studies have been made during the past three years by the American Child Health Association of the physical status of children of school age and of the programs of health supervision which have been instituted in a large number of cities in different parts of the country. The results of these studies are now appearing as school health research monographs of the American Child Health Association, and deal with the puzzling problems of physical measurement of growth and nutrition, special tests and techniques, and dental care, among others.

Underweight Measurement.—The significance of height-weight measurements has been submitted to further tests during the year by different observers. The two primary reasons for weighing school children are for the educational purpose of interesting the child in growing, and to determine, in some degree, the child's health status as suggested by the height-weight ratio. It is emphasized that height-weight-age tables show the *average weight* for children by height-age groups and *do not show* the *ideal weight* for any particular child. Also, there is a difference in the standards set by different standard weight tables. Average weight should not be set as a goal for all children. In the hands of a physician, underweight is a valuable diagnostic factor. (*Amer. Jour. P. H.*, 1929, Sept., p. 969).

The American Indian.—More and deserved attention is being given to the health of the 225,000 Indians who look to the Government or are tied to the United States by various knots of legal guardianship with respect to property, education, health and sanitation, and upbringing. (See *Public Health Reports*, April 19, 1929, U.S. P.H.S.) The Indian Bureau policy is said to be toward persuasive measures and the administration of effective results rather than the use of coercive efforts. The major problems from the health standpoint in the Indian country are shown by surveys to be tuberculosis, factors which are responsible for a high death rate in infants and children, and trachoma. Pending legislation, if successful, should greatly increase the present inadequate resources for the welfare of these people.

MILK VITAMINS

An investigation of the effect of heat on the antineuritic vitamin of milk covers three types of dried milk; one, made by the spray process; a second, made by superheated rollers; and a third, a desiccated albumin milk. In addition, tests were made of commercially pasteurized and home pasteurized milk, and of milk that had been quickly boiled. (Daniels, Giddings, and Jordan, *Jour. Nutrition*, May, 1929.)

Various mixtures of these preparations were given to suckling rats whose mothers were on high protein ration. Results indicate destruction of the antineuritic vitamin in all of the superheated milk except that made by the roller process. Similar results are apparent in milk pasteurized by the open method, while that pasteurized by the closed method showed no vitamin destruction. Milk heated to boiling temperature quickly and cooled slowly is severely affected, while the same milk cooled quickly shows no adverse effect. The authors conclude that temperature and aeration are important factors in the destruction of the antineuritic vitamin.

The concentrated water soluble fraction of milk as a source of Vitamin B has been recently studied by Supplee and his associates (*Jour. Dairy Sc.*, Sept. 1928) who find that the solids of the water soluble fraction, when properly prepared and concentrated, are highly potent in Vitamin B content and compare favorably with dried yeast as a source of the growth promoting and antineuritic factor. These authors used white rats as experimental animals.

HEALTH PRESERVATION

Stimulating Public Opinion.—One of the outstanding events in health education was the introduction for the second year on a Chautauqua Circuit of an able lecturer on health preservation. The lecture was entitled, "Keeping Ahead of the Headlines." in 85 communities in 10 states, some 75,000 persons were reached. Among other beneficial results, the establishment of new full-time county health departments is credited to this lecture course (American Public Health Assoc. *Annual Meeting Proceedings.*)

U. S. Chamber of Commerce.—The Chamber of Commerce of the United States at its 17th annual meeting adopted a resolution which stated: "In order to conserve life and health to the fullest extent there should be further development of national interest and of national activity. In efforts directed to this purpose the Chamber should participate and should enlist the widest possible coöperation on the part of its membership." The Chamber, in coöperation with the American Public Health Association, has launched an Inter-Chamber Health Conservation Contest similar in form to contests heretofore carried on successfully by the Chamber in fire prevention. Already some 130 chambers of commerce have active committees engaged in health conservation work (See *Health Bulletin*, 1929, No. 8, Chamber of Commerce of the United States).

PUBLIC HEALTH ADMINISTRATION

State and Provincial.—An exhaustive survey has been made of the state and provincial boards of health, their organization, activities, policies, and resources (*P. H. Bulletin*, 1929, No. 184, U.S.P.H.S., 727 pp.). This report indicates that extensive studies have been made during the past decade in the development of public health administration, especially in the establishment of full-time county health units under trained medical leadership.

Greece.—At the request of the Greek Government, the health organization of the League of Nations has collaborated in making a technical study of the health program and in the sanitary reorganization of Greece. Coöperation will be continued with certain commissions as the Malaria Commission, the Commission on Education in Hygiene, the Health Insurance Commission, or with the Health Committee of the League (*Reports*, Health Committee of the League of Nations, April and May, 1929).

FEDERAL HEALTH LEGISLATION

A new bill (H.R. 3142) for the coordination of Federal health activities was introduced into the 71st Congress by Representative Parker; and a companion measure was introduced by Senator Jones in the Senate as S. 1195. This bill would result in a modest but important reorganization of the United States Public Health Service. Another bill (H.R. 3143) providing for a National Institute of Health has been reintroduced in the Senate as S. 1171. The previous Parker bill was passed by the last Congress but was vetoed on the advice of the former Director of the Budget who is no longer in office.

BIBLIOGRAPHY

One of the outstanding books of the year is *The Life of Herman N. Biggs, M.D.*, late Health Commissioner of the State of New York. A builder of the modern public health movement and a pioneer in the campaign for early discovery and adequate care of tuberculosis, Dr. Biggs contributed more than almost any other man of his day to the cause of public health. His work and influence are beautifully set forth in this new volume published by Lea and Febiger.

VITAL STATISTICS

By T. F. Murphy

Chief Statistician for Vital Statistics, U. S. Bureau of the Census

FEDERAL STATISTICS

Federal mortality and birth statistics are compiled for only that part of the United States known as the "death registration area" and the "birth registration area." (Mortality Statistics and Birth, Still-birth, and Infant Mortality Statistics—annual reports—published by the Bureau of the Census.) A "registration area" is that portion of the United States recognized by the Federal Government as having adequate registration laws, and at least 90 per cent complete registration. In 1928 the death registration area included 44 states, the District of Columbia, the Territory of Hawaii, the Virgin Islands, and 10 registration cities in nonregistration states, or 95.4 per cent of the total population, while the birth registration area, composed of these forty-four states, the District of Columbia, and the Virgin Island, included 94.4 per cent of the total population. The following tables show the State growth of these two areas:

STATES IN DEATH REGISTRATION AREA

State	Year Admitted	State	Year Admitted	State	Year Admitted
Massachusetts	1880 [1]	Washington	1908	Delaware	1919
New Jersey		Wisconsin		Florida	
Dist. of Columbia [2]		Ohio	1909	Mississippi	
Connecticut	1890 [1]	Minnesota	1910	Nebraska	1920
Delaware [3]		Montana		Georgia [7]	1922
New Hampshire		North Carolina [5]		Idaho	
New York		Utah		Wyoming	
Rhode Island		Kentucky	1911	Iowa	1923
Vermont		Missouri		North Dakota	1924
Maine	1900 [1]	Virginia	1913	Alabama	1925
Michigan		Kansas	1914	West Virginia	
Indiana	1900	North Carolina [6]	1916	Arizona	1926
California	1906	South Carolina		Arkansas	1927
Colorado		Tennessee	1917	Georgia	1928
Maryland		Illinois	1918	Oklahoma	
Pennsylvania	1906	Louisiana			
South Dakota [4]		Oregon			

[1] Census year ending May 31.

[2] Included in states.

[3] Dropped from the area in the census year 1900.

[4] Dropped from the area in 1910.

[5] Included only municipalities having population of 1,000 or more in 1900.

[6] The remainder of the State of North Carolina was added to the registration area in 1916. (See note 5.)

[7] Dropped from the area in 1925; state registration law declared unconstitutional.

STATES IN BIRTH REGISTRATION AREA

State	Year Admitted	State	Year Admitted
Connecticut	1915	Nebraska	1920
Maine		Delaware	1921
Massachusetts		Mississippi	
Michigan		New Jersey	
Minnesota		Illinois	1922
New Hampshire		Montana	
New York		Wyoming	
Pennsylvania		Florida	1924
Rhode Island [1]		Iowa	
Vermont		North Dakota	
District of Columbia [2]		West Virginia	1925
Maryland	1916	Arizona	1926
Indiana	1917	Idaho	
Kansas		Alabama	1927
Kentucky		Arkansas	
North Carolina		Louisiana	
Ohio		Missouri	
Utah		Tennessee	
Virginia		Colorado	1928
Washington		Georgia	
Wisconsin		Oklahoma	
California	1919	South Carolina	
Oregon			

[1] Dropped from the registration area in 1919; readmitted in 1921.
[2] Included in registration states.

Birth Rates.—The birth rate of the birth registration area for 1928 was 19.7, the lowest since the establishment of the area in 1915, which year had a record high rate of 25.1. The rate of natural increase indicated by the difference between the birth rate and the death rate was 11 per 1,000 for 1915, while only 7.7 for 1928.

Infant Mortality Rates.—The infant mortality rate of the birth registration area for 1928 was 69, strikingly less than the 1916 and 1918 rates (101 each) but 4 higher than the rate for 1927, which was only sixty-five and the lowest since the establishment of the area in 1915.

BIRTH REGISTRATION AREA: 1915 TO 1928

Year	Birth Registration Area								
	Population [1]		Land Area		Births [2]		Deaths [2]		Deaths of Infants Under One Year of Age per 1,000 Births
	Number	Per Cent of United States Total	Square Miles	Per Cent of United States Total	Number	Rate per 1,000 Population	Number	Rate per 1,000 Population	
1915	30,936,179	31.1	292,860	9.8	776,304	25.1	436,593	14.1	100
1916	32,788,670	32.5	302,801	10.2	818,983	25.0	486,682	14.8	101
1917	54,771,416	53.6	794,819	26.7	1,353,792	24.7	776,222	14.2	94
1918	55,515,241	53.6	794,819	26.7	1,363,649	24.6	996,627	18.3	101
1919	61,483,423	58.6	1,075,506	36.2	1,373,438	22.3	798,104	13.0	87
1920	63,659,441	59.8	1,152,314	38.7	1,508,874	23.7	836,134	13.1	86
1921	70,425,705	65.3	1,209,224	40.7	1,714,261	24.3	825,511	11.7	76
1922	78,885,852	72.2	1,508,946	50.7	1,774,911	22.5	938,545	11.9	76
1923	79,952,425	72.2	1,508,946	50.7	1,792,646	22.4	992,237	12.4	77
1924	85,424,653	76.2	1,689,576	56.8	1,930,614	22.6	1,006,994	11.8	71
1925	87,636,000	76.0	1,683,103	56.6	1,878,880	21.4	1,030,518	11.8	72
1926	89,988,000	76.8	1,880,267	63.2	1,856,068	20.6	1,093,511	12.2	73
1927	103,591,000	87.3	2,139,894	72.0	2,137,836	20.6	1,176,805	11.4	65
1928	113,348,000	94.4	2,402,186	80.8	2,233,149	19.7	1,361,987	12.0	69

[1] Estimated July 1.
[2] Exclusive of stillbirths.

Death Rates.—The death rate of the registration area for 1928 was 12.0 per 1,000 estimated population. Of the 1,378,675 deaths which occurred in the death registration area in 1928, more than 60 per cent were due to eight causes: Diseases of the heart, influenza and pneumonia, cancer, nephritis, cerebral hemorrhage, softening of the brain, tuberculosis, bronchitis and broncho-pneumonia, and diabetes mellitus. The death rate from accidents (excluding automobile accidents) declined from 73 per 100,000 population in 1918 to 58.4 in 1928, but the death rate from automobile accidents (excluding collisions with railroad trains and street cars) increased from 9.3 to 20.8 per 100,000 population.

CAUSES OF DEATH

Cause of Death	Death Rate per 100,000 Estimated Population in the Registration Area in Continental United States							
	1900	1910	1920	1924	1925	1926	1927	1928
All causes (exclusive of still-birth)	1,755.0	1,496.2	1,306.0	1,183.5	1,182.3	1,222.7	1,141.9	1,204.1
Typhoid and paratyphoid fever	35.9	23.5	7.8	6.7	8.0	6.5	5.5	4.9
Malaria	7.9	2.2	3.6	2.5	2.1	1.9	2.7	3.6
Smallpox	1.9	0.4	0.6	0.9	0.7	0.4	0.1	0.1
Measles	12.5	12.3	8.8	8.6	2.3	8.2	4.1	5.4
Scarlet fever	10.2	11.6	4.6	3.1	2.7	2.5	2.3	1.9
Whooping cough	12.1	11.4	12.5	8.3	6.7	8.9	6.9	5.4
Diphtheria	43.3	21.4	15.3	9.4	7.8	7.5	7.8	7.2
Influenza and pneumonia	181.5	115.1	153.7	76.8	84.5	99.3	69.4	103.7
Erysipelas	5.1	4.5	3.1	2.5	2.4	2.5	2.4	2.4
Miningococcus meningitis	(1)	0.4	1.6	1.0	1.1	1.3	1.6	2.6
Tuberculosis of the respiratory system and acute disseminated tuberculosis	181.8	139.7	100.8	80.2	77.1	77.8	72.5	71.4
Other forms of tuberculosis	20.1	20.6	13.4	10.2	9.5	9.3	8.3	7.8
Cancer and other malignant tumors	63.0	76.2	83.4	91.9	92.6	94.9	95.6	95.9
Diabetes mellitus	9.7	14.9	16.1	16.6	16.9	18.0	17.5	19.0
Cerebral hemorrhage and softening, embolism and thrombosis (not cerebral)	75.5	79.4	86.4	94.4	86.5	89.0	87.3	91.3
Diseases of the heart	132.1	158.8	159.3	178.1	185.5	199.1	195.7	207.7
Bronchitis and broncho-pneumonia	67.6	70.5	67.9	48.2	45.1	50.5	39.2	44.7
Diarrhea and enteritis [2]	133.2	117.4	54.4	34.8	39.3	33.6	27.6	26.8
Appendicitis and typhlitis	9.7	11.4	13.4	14.9	15.1	15.0	15.0	15.2
Hernia, intestinal obstruction [3]	12.2	12.4	10.6	10.6	10.8	11.2	10.4	10.4
Cirrhosis of the liver	12.9	13.9	7.1	7.4	7.3	7.2	7.5	7.5
Acute and chronic nephritis	89.0	99.1	89.4	89.6	96.3	98.3	92.5	95.0
Puerperal septicemia	5.7	7.2	6.6	5.8	5.5	5.2	5.3	5.0
Other puerperal causes	7.6	8.5	12.6	9.7	9.3	9.1	8.4	8.7
Congenital malformations and diseases of early infancy	91.8	88.1	84.9	78.3	73.9	71.5	67.7	65.6
Suicide	11.5	16.0	10.2	12.2	12.1	12.8	13.3	13.6
Homicide	2.1	5.9	7.1	8.5	8.6	8.8	8.7	8.8
Automobile accidents [4]	(1)	1.8	10.4	15.7	17.0	17.9	19.5	20.8
Automobile and railroad-train collision	(1)	(1)	(1)	(1)	1.2	1.5	1.5	1.8
Automobile and street-car collision	(1)	(1)	(1)	(1)	0.5	0.4	0.4	0.5
Other external causes	79.0	82.6	61.0	60.7	59.6	58.8	57.0	56.1
Unknown or ill-defined diseases	73.8	23.1	17.7	17.7	17.4	17.8	17.6	20.6

[1] Not separately tabulated.

[2] From 1900 to 1920 includes ulcer of the duodenum.

[3] From 1900 to 1920 includes adhesions of intestines.

[4] Excludes deaths from collision with railroad trains and street cars.

DEATH REGISTRATION AREA: 1880-1928

Year	Estimated population July 1 of Continental United States	Registration Area in Continental United States					
		Estimated population, July 1		Land Area		Deaths from All Causes[1]	
		Number	Per Cent of Total	Square Miles	Per Cent of Total	Number	Rate per 1,000 Population
1928	120,013,000	114,495,000	95.4	2,402,433	80.8	1,378,675	12.0
1927	118,628,000	108,327,000	91.3	2,274,398	76.5	1,236,949	11.4
1926	117,136,000	105,167,000	89.8	2,221,892	74.7	1,285,927	12.2
1925	115,378,000	103,108,000	89.4	2,108,072	70.9	1,219,019	11.8
1924	112,078,611	99,200,298	88.5	2,091,456	70.3	1,173,990	11.8
1923	110,663,502	96,986,371	87.6	2,021,237	68.0	1,193,017	12.3
1922	109,248,393	93,241,643	85.3	1,965,589	66.1	1,101,863	11.8
1921	107,833,284	88,667,602	82.2	1,726,012	58.0	1,032,009	11.6
1920	106,418,175	87,486,713	82.2	1,726,012	58.0	1,142,558	13.1
1919	105,003,065	85,166,043	81.1	1,649,281	55.5	1,096,436	12.9
1918	103,587,955	81,333,675	78.5	1,546,166	52.0	1,471,367	18.1
1917	102,172,845	74,984,498	73.4	1,349,629	45.4	1,068,932	14.3
1916	100,757,735	71,349,162	70.8	1,307,819	44.0	1,001,921	14.0
1915	99,342,625	67,095,681	67.5	1,228,704	41.3	909,155	13.6
1914	97,927,516	65,813,315	67.2	1,228,644	41.3	898,059	13.6
1913	96,512,407	63,200,625	65.5	1,147,039	38.6	890,848	14.1
1912	95,097,298	60,359,974	63.5	1,106,777	37.2	838,251	13.9
1911	93,682,189	59,183,071	63.2	1,106,734	37.2	839,284	14.2
1910	92,267,080	53,831,742	58.3	997,978	33.6	805,412	15.0
1909	90,691,354	50,870,518	56.1	765,738	25.7	732,538	14.4
1908	89,073,360	46,789,913	52.5	725,117	24.4	691,574	14.8
1907	87,455,366	43,016,990	49.2	603,151	20.3	687,034	16.0
1906	85,837,372	41,983,419	48.9	603,066	20.3	658,105	15.7
1905	84,219,378	34,052,201	40.4	212,744	7.2	545,533	16.0
1904	82,601,384	33,345,163	40.4	212,744	7.2	551,354	16.5
1903	80,983,390	32,701,083	40.4	212,762	7.2	524,415	16.0
1902	79,365,396	32,029,815	40.4	212,762	7.2	508,640	15.9
1901	77,747,402	31,370,952	40.3	212,770	7.2	518,207	16.5
1900	75,994,575	30,765,618	40.5	212,621	7.1	539,939	17.6
1900[2]		28,807,269	37.9	176,878	5.9	512,669	17.8
1890[2]	62,947,714	19,659,440	31.2	90,695	3.0	386,212	19.6
1880[2]	50,155,783	8,538,366	17.0	16,481	0.6	169,453	19.8

[1] Exclusive of stillbirths.
[2] Census year ending May 31.

COGNATE SOCIETIES

ALLIANCE AGAINST FOOD FRAUD, 300 Madison Ave., N. Y. C.

ALLIED DENTAL COUNCIL, 425 Lafayette St., New York City.

AMERICAN ACADEMY OF APPLIED DENTAL SCIENCES, 587 Fifth Ave., N. Y. C.

AMERICAN ASSN. FOR MEDICAL PROGRESS, 370 Seventh Ave., N. Y. C.

AMERICAN COLLEGE OF SURGEONS, 40 E. Erie St., Chicago, Ill.

AMERICAN GYNECOLOGICAL SOCIETY 104 S. Michigan Ave., Chicago, Ill.

AMERICAN HEART ASSN., INC., 37 Seventh Ave., N. Y. C.

AMERICAN INSTITUTE OF HOMEOPATHY 393 Seventh Ave., N. Y. C.

AMERICAN LARYNGOLOGICAL ASSN. 1811 Spruce St., Philadelphia, Pa.

AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY INC., 145 W. 58th St., N. Y. C.

American Medical Assn., 2 East 103rd St., New York City.

American Occupational Therapy Assn., 175 Fifth Ave., N. Y. C.

American Opthalmological Society, 2213 Walnut St., Philadelphia, Pa.

American Osteopathic Assn., 844 Rush St., Chicago, Ill.

American Physiological Society, Rockefeller Institute, New York City.

American Public Health Assn., 370 Seventh Avenue, New York City.

American Society for the Control of Cancer, 25 W. 43rd St., New York City.

American Society of Clinical Pathologists, 256 Metropolitan Bldg., Denver, Col.

American Veterinary Medical Assn., 716 Book Bldg., Detroit, Mich.

Assn. of American Medical Colleges, 25 E. Washington St., Chicago, Ill.

Assn. of Military Surgeons of the U. S., Army Medical Museum, Washington, D. C.

American Society of Tropical Medicine, Box 131, Penn. Ave. Station, Washington, D. C.

Gorgas Memorial Institute, 1598 Madison Ave., N. Y. C.

Narcotic Drug Control League, Inc., 40 Wall St., N. Y. C.

National League for Nursing Education, 370 Seventh Ave., New York City, N. Y.

National Tuberculosis Assn., 370 Seventh Ave., N. Y. C.

New York Academy of Medicine, 2 East 103rd St., N. Y. C.

New York Academy of Sciences, 77th St. and Central Park West, N. Y. C.

Osteopathic Aid Assn., 103 Park Ave., N. Y. C.

Public Health Committee, 2 E. 103rd St., New York City.

Society of American Bacteriologists, Cornell University, Ithaca, N. Y.

Society of Medical Jurisprudence, 2 East 103rd St., N. Y. C.

Southern Medical Assn., Empire Bldg., Birmingham, Ala.

United Board of Health Control, Inc., 233 Broadway, N. Y. C.

United Hospital Fund, 105 E. 22nd St., N. Y. C.

United States Hay Fever Assn., Bethlehem, N. H.

DIVISION XXIV

PHILOSOPHICAL AND SOCIAL SCIENCES

PHILOSOPHY

By A. A. Roback

University Extension Lecturer, Commonwealth of Massachusetts

METAPHYSICS

Whitehead.—In previous surveys, it has been said that metaphysics is waning fast in America, that at most a desultory volume manages to see the light of day; and even that offering is confined to the camp of neo-scholasticism and proves to be hardly more than a textbook for students in Catholic colleges. Our philosophical barometer this year shows a deflection in the direction of the past. Scholasticism, albeit in a twentieth century garb, has become elevated through the important work of A. N. Whitehead, whose *Process and Reality* (Macmillan, xii + 545 pp.) may be considered as the capstone of all his philosophical writings. Here we have the development of a cosmology in the traditional sense, comprehensive or rather all-embracing in its scope. The author is pleased to call his system "the philosophy of organism," combining the critical spirit of the Pre-Kantian British empiricists with the data of modern science. That it is a speculative philosophy goes without saying, but for Whitehead the term "speculative" apparently has no terrors. The system leads up to the enthronement of God as the "unlimited conceptual realization of the absolute wealth of potentiality. Those who suppose that the nature of God is discussed only in the comparatively brief chapter at the end of the book can hardly be familiar with the contents of the volume. To a certain extent *Process and Reality* is a theological treatise, a modern theodicy; for there is hardly a section in which the attributes of God do not figure ("Apart from the intervention of God, there could be nothing new in the world, and no order in the world. . . . The novel hybrid feelings derived from God, with the derivative sympathetic conceptual valuations, are the foundations of progress." (p. 377)

The Pragmatic Antiphonal.—That John Dewey should be mentioned by Whitehead as a source of indebtedness in the preface, and, furthermore, that he should speak so glowingly of a book which teems with definitions and abstractions and more than borders on the dogmatic, as instanced by such passages as "The primordial appetitions which jointly constitute God's purpose are seeking intensity and not preservation. He, in his primordial nature, is unmoved by love for this particular, or that particular; for in this foundational process of creativity, there are no pre-constituted particulars"—is a rather encouraging sign, although difficult to understand in the light of his (Dewey's) own teaching. One must come to the conclusion that metaphysics cannot be wholly extinct even in America when such a ponderous tome can command the respect of those who speak a language altogether foreign to it. As if to corroborate this conclusion, W. M. Urban deliberately subheaded his recent work *The Intelligible World* (Macmillan, 479 pp.) "Metaphysics and Value." Written in a different vein from that of Whitehead's scholastic presentation, *The Intelligible World*, with its humanistic flavor would appeal to the less academic. It is a plea for metaphysics, and in the last analysis, a brief for axiol ogy; for, when all is said and done, the concept of value, according to the author, is the core of metaphysics.

The Pragmatic Attack.—If the year 1929 has witnessed a curious revival of metaphysics, it is not without significance that the sharpest battle against not only metaphysics but the theoretical in general was waged in the same year. Indeed, John Dewey's stand in his Gifford Lectures, *The Quest for Certainty* (Coward-McCann, xx + 433 pp.), seems to be just as definitive on the pragmatic side as Whitehead's is on the intellectualistic. In this book, more than in all of his books put together, do we find a systematic and closely reasoned presentation of his doctrines. The revolt against thought as such is followed up here in the stimulating manner characteristic of the author and expressed in the usual felicitous mode. "The history of the theory of knowledge or epistemology would have been very different if instead of the word 'data' or 'givens', it had happened to start with calling the qualities in question 'takens.'" Reality, to him, has more than one avenue of approach, and it may be reached by doing even more than by thinking. The emphasis on the motor side of man has endured with Dewey since his psychological preoccupation, but it has never taken on such bold relief as in *The Quest for Certainty*.

Hocking.—This viewpoint forms the basis of a lengthy discussion by E. W. Hocking ("Action and Certainty") at the meeting of the American Philosophical Association. In his *Types of Philosophy*, which came out about the same time as Dewey's volume, Hocking had already covered the ground, coming altogether to a different conclusion. What R. B. Perry's *Present Philosophical Tendencies* was to realists, Hocking's *Types of Philosophy*, written in a lucid and straightforward style, is to idealists. The one may be considered complementary to the other; for here we obtain a sympathetic picture of mysticism and a philosophical *credo* which points again to the strength of metaphysics in America, despite the verdicts of social philosophers and mechanists. For Hocking the world is a "Self, infinite in its depths and mystery . . . there is nothing higher than selfhood, and nothing more profound."

ETHICS

Instead of logic and epistemology holding the philosophical fort as in the last few years, we find that ethics has received comparatively more attention. Each of the books here mentioned has made more or less of an impression. In academic circles, J. H. Dunham's *Principles of Ethics* (*Prentice-Hall*, xiii + 510 pp.) will stand out as a systematic concatenation of ethical concepts in a traditional setting but critically interpreted. It is probably the most solid work on the subject we have had for some years. The layman who wants to be, primarily, *stimulated* will find in W. Lippmann's *A Preface to Morals* (Macmillan, vii + 348 pp.) a suggestive treatment of the ethical problems along naturalistic lines. Lippmann delights in confuting and teasing the traditionalist, but his fundamental category of "disinterestedness" is, at bottom, perhaps, just as traditionally grounded as some of the others he looks at askance.

In *Men and Morals* (Doubleday, Doran, x + 425 pp.) by Woodbridge Riley, we have a historical survey of moral principles showing the interplay of character and conventional imposition. The book is a plea for personal liberty and an indictment of public opinion as it manifests itself in our state of democracy,—a tyranny of the majority over the enlightened minority. The theme is, of course, not new, but it carries with it this time a heightened effect because of the actualities of the day and the historical sense and insight of the writer.

Social ethics is represented in Ella Lyman Cabot's *Temptations to Right Doing* (Houghton Mifflin) in which the author proffers some counsel to those in charge of the young. Striking an inspirational note, she puts in a word for the underdog, the stupid, whose powers, according to her, need but awakening. An interesting pair of terms, *viz.*, "transcendence" and "immanence," which she introduces as typifying two sorts of sympathy or vision: (a) seeing just exactly where one stands; (b) seeing beyond for one's road—it would seem—suggests merely the difference between *considerateness* and *thoughtfulness.*

W. K. Wright's *General Introduction to Ethics* (Macmillan, xv + 559 pp.) is a sound textbook which brings to the student a businesslike examination of the data of ethics from a somewhat eclectic angle, with emphasis on the political and social elements. The arrangement of subjects differs but little from that of the ordinary textbook in ethics.

LOGIC AND EPISTEMOLOGY

In logic and epistemology, the output has to some extent fallen off. Perhaps this is more the case with the latter; for several excellent treatises on logic and the classification of knowledge have appeared, each disclosing a slightly different viewpoint. In logic, there has been less of a tendency to re-hash old material than in any other field of philosophy. Also there is shown a decided inclination on the part of authors to keep abreast of the progress in general science. As for the philosophical system which inspires these writers, each one of the major philosophies is represented. In *The Fields and Methods of Knowledge* (Knopf, xxv + 398 pp.) by P. W. Ward and R. F. Piper we have a tinge of idealism centering around the concept of the self, and in an attempt to inculcate into the mind of the student a regard for personalism. The *motif* running through a book of a similar character by H. E. Bliss, viz., *The Organization of Knowledge and The System of the Sciences* (Holt, xx + 433 pp.)—a book, by the way, to be prized especially by librarians who need orientation in the relationship of the sciences and the branches in a given science—is more realistic, while C. I. Lewis' *Mind and the World-Order* (Scribner's, xiv + 446 pp.) sets forth a doctrine of what the author calls "conceptualistic pragmatism," resembling and probably based on Kant's critical philosophy in its realistic interpretation. A clear discussion of the place of mathematics in the realm of science and its logical substructure is afforded in Keyser's *Pastures of Wonder* (California University Press, xii + 208 pp.), written in a non-technical vein. The same press has brought out A. P. Uchenko's *The Logic of Events* (180 pp.); and if we are to include translations, we should record F. Enriques' *Historic Development of Logic* (Holt, xi + 271 pp.), which owes its English form to J. Rosenthal.

HISTORY OF PHILOSOPHY

New Publications.—Not a single history of philosophy, in the proper sense of the word, and only a few monographs on individual thinkers or philosophical groups can be recorded in 1929. The *Major Traditions of European Philosophy* by G. Boas which, curiously enough, the publishers (Harper, 497 pp.) have been also selling, for what reason I know not, under another title, *The Adventures of Human Thought,* is an informative miscellany, disclosing certain interesting sidelights in the history of philosophy, without delving into the fundamental problems. Mary Mills Patrick has given us a well-rounded study of *The Great Sceptics* (University of California Press, xxi + 339 pp).

In *The Son of Apollo* (Houghton Mifflin) F. J. G. Woodbridge has given a fine interpretation of Plato, which seems to be the appreciative counterpart of Santayana's somewhat disparaging account.

An event in the annals of American philosophy is the publication of a biography and the writings of Samuel Johnson, one of the pioneers of American thought. This work, edited by H. W. Schneider and others, and prefaced by N. M. Butler, consists of four volumes comprising over 2000 pages.

Textbooks.—Not only the history of philosophy but even textbook writing has suffered a decline lately. While in one of the previous years, no fewer than half a dozen such books appeared in different parts of the country, the only volume of a similar nature published this year, at the present writing, is R. H. Dotterer's *Philosophy By Way of Science* (Macmillan, xv + 469 pp.).

Selections.—To make up for the deficiency in this field, the philosophical market has been inundated with books of selections from the better-known philosophers. These are primarily intended for students. Scribner's & Sons have already issued the following books in this series: *Aristotle; Bacon; Berkeley; Descartes; Hegel; Hume; Kant; Locke; Plato* (two volumes); *Schopenhauer* and *Selections from Mediæval Philosophers. Hobbes* and *Spinoza* are in press.

Biographical.—The lay interest in philosophers, to judge from the readiness of publishers to bring out series of biographical expositions, has not waned in the last year. For, in addition to the three rival series mentioned last year (Scribner's, Simon & Schuster, and The Modern Library), it appears that Little Brown & Co. is publishing a series under the title of *Leaders of Philosophy.* The first volume, on Leibnitz, (vi + 222 pp.) is written by H. W. Carr. The second volume, on Spinoza, (xli + 250 pp.) is the work of Leon Roth, Akhad ha-Am professor of philosophy at the University of Jerusalem.

Popular Magazine.—The lay interest in philosophy, in fact, has become so much in evidence lately that a magazine has been launched in which ideas and philosophical problems have been simplified and brought home to the reader partially by means of pictorial illustrations. This magazine, called *The Thinker,* first appeared late in October, and one may gather from certain indications that its existence is assured.

HUMANISM

A German critic, domiciled in the United States, some years ago commented on the difference between American and German philosophy in that the former was academic and technical, while the latter was surrounded by minds of comprehensive range. Men like Dilthey or Scheler could not be found in American Universities. The American philosopher is essentially a specialist, and therefore must lack the breadth of vision so characteristic of the leaders of schools in continental Europe. The criticism, of course, is just; but the titles and subject-matter of a number of books published in this country during the last year would go to show that there is an awakening to the life of cultured opulence.

There is every reason to believe that the gulf between the humanistic writer and the professorial philosopher is on the point of being bridged; and there is no justification for ignoring the former in abstract surveys of a philosophical nature. The words "culture" and "humanism" are not so rarely seen in print as, let us say, a decade ago, or even more recently, and a long list of books treating of these subjects may be drawn up.

For the present, it will suffice to mention only a few which have come out since the last survey. L. J. A. Mercier's *Le mouvement humaniste aux États Unis,* which though published in France (Hachette, 1928, x + 283 pp.) is nevertheless the work of a Harvard professor of French. In this monograph only Babbit, Brownell and More are discussed at length, but undoubtedly the humanist movement is much more extensive than indicated here.

The Philosophic Way of Life (University of Chicago, xiii + 234 pp.) by T. V. Smith, is a humanistic introduction to the philosophies of Royce (the guide to a religious approach), James (the scientific guide), Dewey (the pillar of a social philosophy), and Santayana (the esthetic philosopher). For the guide to the philosophic way of life, the author is still searching.

The philosophy of culture is most directly approached by J. C. Powys in his *Meaning of Culture* (Norton, x + 275 pp.), which perhaps is a bit subjectivistic, but inasmuch as all cultured persons have a great deal in common, the tastes, maxims, and experiences of the author will probably be to a large extent those of the class as a whole.

In *The Modern Temper* (Harcourt, Brace, xvi + 259 pp.) J. W. Krutch deals understandingly with "The Paradox of Humanism," "The Disillusion with the Laboratory," "The Phantom of Certitude," and "The Tragic Fallacy" in which he is at his best. Lynn Thorndike's *Science and Thought in* *the Fifteenth Century* (Columbia Univ. Press, xii + 387 pp.) while far removed from our own time, brings us to the cradle of modern humanism. Of a more metaphysical nature is E. Noble's *Our Slumbering World* (Holt, 1928, vi + 301 pp.). The anthropological key to our present-day culture is given by R. H. Lowie in his thought-provoking book *Are We Civilized? Human Culture in Perspective* (Harcourt, Brace, xiv + 306 pp.), in which he is inclined to belittle our prowess and our pride in our civilization. His aversion to eugenics, his slighting of Galton and condemnation of the Nordic superiority view are in accord with the following striking passage to be found in the peroration: "He [man] is biologically what he was 20,000 years ago. His brain is not a whit better than the Pleistocene reindeer hunter's. . . . His science has been a by-product of adaptation to Nature."

An antidote to Lowie's naturalism, almost animalism, may be had in Paul Elmer More's *The Demon of the Absolute* (Princeton University, 1928, x + 183 pp.). The Plato cult which the latter established, as his trilogy was being expanded into a pentalogy, had to become more and more saturated with Christian theology in the course of its evolution.

RELIGIOUS PHILOSOPHY

Although the books on religion continue to be legion (not for the reason that a great many are interested in religion, but because it is easier to write on religion than on any other subject under the sun with impunity, and once a religious book is published, it is apt to be put into hundreds of libraries and other institutions) there are few books worthy of mention as throwing any light on the philosophy of religion. Philosophy and religion are still lumped together in the book-lists of the foremost newspapers and magazines, but quite often the first half of the rubric is represented by a class of which no members exist, the whole section consisting of books on religion. It is interesting, however, that quantitatively, the books on religious thought are far in excess of those in any other field of philosophy. G. B. Smith is the author of *Current Christian Thinking* (Univ. of Chicago Press) and the editor of *Religious Thought in the Last Quarter-Century* (University of Chicago, 129 pp.). H. N. Wieman has taken for his theme *Methods of Private Religious Living* (Macmillan, 219 pp.). H. W. Dresser's *Outlines of the Psychology of Religion* (Crowell, xiii + 451 pp.) is really more a philosophy of religion than a psychology. J. H. Coffin's *The Soul Comes Back* (Macmillan, 207 pp.) is an attempt to reëstablish the soul in the economy of science. B. I. Bell's *Beyond Agnosticism* (Harper, viii + 170 pp.) is a personal account of one's conversion from agnosticism to faith.

The best studies, however, on religion for the past year are: *Religion* by E. S. Ames (Holt, vi + 324 pp.), in which the author, though progressive in his point of view, strikes a moralistic note; H. B. Alexander's *Truth and the Faith* (Holt, vi + 313 pp.), *Religion and the Modern World* by H. J. Randall and H. J. Randall Jr. (Stokes, xii + 249 pp.); and J. Y. Simpson's *Nature, Cosmic, Human and Divine* (Yale, ix + 157 pp.).

Because of its religious background and origination it would perhaps be appropriate to mention here Wm. McDougall's *Modern Materialism and Emergent Evolution* (Van Nostrand, x + 249 pp.) which he originally delivered as a series of lectures at the Louisville Presbyterian Theological Seminary. The book is an examination of the claims of mechanists in the light of present-day psychology and biology, but carries religious implications, although not nearly to the extent of Whitehead's *Process and Reality*.

IMMORTALITY

The perennial, one might say, eternal, subject of immortality has been in the fore this year; since, in addition to the Ingersoll lecture, we have had a symposium of beliefs on the part of a number of men in the public eye. *We Believe in Immortality*, edited by S. Strong (Coward-McCann, 1928, 193 pp.) contains the expressions and opinions on immortality of 91 men, 27 of whom are either college presidents or professors, while the majority is made up of business men, journalists, men of letters and political dignitaries. The utterances are mainly positive; and it would be interesting to compare the results of this symposium with those of the questionnaire instituted some years ago on the same subject by Leuba. A. A. Bowman's address before the Philosophical Union of the University of California at Los Angeles was on "The Philosophical Approach to the Problem of Immortality."

Sir Oliver Lodge presents his own views on the subject, based on his spiritualistic experiences, in a book entitled *Why I believe in Immortality* (Doubleday Doran, viii + 206 pp.). On the other hand, in *The Rationalist Annual,* (1930) we find an article by J. W. A. Hickson "Is Human Immortality Probable or Indispensable?" which sums up succinctly the main objections to the doctrine of immortality.

SYMPOSIA

The popularity of collaborations by authorities seems to increase, judging both by the sales, as well as by the growing number of such collaborations. *Whither Mankind,* edited by C. A. Beard (Longmans, viii + 408 pp.) which was published toward the end of 1928 sold about 100,000 copies within the twelve months. The chapters dealing with our field are: "The Civilizations of the East and the West" by Hu Shih; "Ancient & Mediæval Civilizations" by H. W. van Loon; "Science" by Bertrand Russell; "Race and Civilization" by G. A. Dorsey; "Religion" by J. H. Robinson; "Philosophy" by John Dewey.

Freedom in the Modern World (Coward-McCann, 1928, xii + 304 pp.) edited by H. M. Kallen, includes essays by John Dewey and Father Ryan. In this volume, the concept of freedom is discussed from several different angles, legal, philosophical, literary, journalistic, artistic, etc.

An unusually important combination textbook is the symposium, *Modern Scientific Knowledge of Nature, Man and Society* (Ronald, xiv + 592 pp.) edited by F. A. C. Cleveland, with chapters by Giddings, Brightman, Bernard, Shapley and Groves, the larger part of the book being the contribution of members of the Boston University faculty. The student is here taken right through the sciences from physics to sociology and the study of personality. There is a slight incongruity between the personalistic tone of some of the chapters and the distinctly behavioristic implications in several other chapters. As a compendium of knowledge presented in elementary and yet not too popular form, the book fills a conspicuous place in our educational literature.

Essays in Philosophy (Open Court, xvi + 337 pp.) is the title of a symposium by 17 doctors of philosophy of the University of Chicago and edited by T. V. Smith and W. K. Wright. A wide range of topics are included in this collaboration and well handled, even if it is difficult to see the special occasion of such a symposium. There is nothing particularly "Chicagoan" about this volume. If the Chicago "School of Philosophy" is still in existence as a unit, it certainly is not represented here except by one or two papers. Perhaps the chief inference to be drawn from a psychological point of view is that no matter what the influence of the intellectual environment and rearing has been, the maturer we become, the greater the tendency to find ourselves in the incubation of our original dispositions. Perhaps the Chicago School is characterized by an anti-intellectualist current moving in pragmatist, behavioristic and sociological eddies, but there are certainly enough exceptions to point to the dominance of individual channels of thought.

POLITICAL PHILOSOPHY

K. Martin has produced a comprehensive volume on the French political philosophers in his *French Liberal Thought in the Eighteenth Century* (Little Brown, xviii + 313 pp.) and B. F. Wright is the author of *A Source Book of American Political Theory* (Macmillan, xi + 644 pp.). Of a less political and more historical character is the study on *Cicero in the Commonwealth* (Ohio State, ix + 276 pp.) by G. H. Sabine and S. B. Smith.

H. W. Schneider's *Meaning of the Fascist State* is an inquiry into the philosophical principles of modern absolutism in statecraft.

JEWISH PHILOSOPHY

Although Jewish philosophy is still associated primarily with the scholastic age, which inspired H. A. Wolfson's handsome study *Crescas' Critique of Aristotle* (Harvard Univ. Press, 759 pp.), Isaac Hosik's edition of Joseph Albo's *Sefer Ha-Ikrim* (in two volumes), and S. Rosenblatt's *The High Ways to Perfection of Abraham Maimonides* (Columbia Univ. Press, 213 pp.), A. A. Roback has brought out a survey of the Jewish contributions to modern culture, psychologically and historically interpreted, as indicated by the title *Jewish Influence in Modern Thought* (Sci-Art, Cambridge, Mass., 506 pp.).

SCHOLASTICISM

There has been little activity in the ranks of scholasticism to compare with that of the past few years, except that one of the constituent colleges of the University of Toronto has been influential in founding an institute for scholastic studies in that University. E. Gilson, formerly of the Sorbonne and Harvard University, has been appointed as director.

The work on *Cosmology* by J. A. McWilliam (1928, x + 243 pp.) is a typical manual for seminary students.

LITERARY PHILOSOPHY

Under this rubric, which of course is artificial, we may record G. R. Swann's *Philosophical Parallelisms in Six English Novelists* (Univ. of Pennsylvania) and A. D. Snyder's *Coleridge on Logic and Learning* (Yale). This little volume necessitated a good deal of research on Coleridge's unpublished manuscripts, and from the excerpts it would seem that T. H. Green, who at one time considered the possibility of giving to the world the huge bulk of Coleridge's writings, was well-advised in leaving them undisturbed in the British Museum and vaults of the Coleridge family.

THE DEWEY CELEBRATION

An unusual honor was bestowed on Prof. Dewey when his seventieth birthday was celebrated on Oct. 18 and 19, with addresses, papers, and a luncheon at which some of the country's foremost thinkers and reformers were present. Additional honors were bestowed on him by the National Education Association and the Teachers Union for his services on behalf of education in the United States.

A volume of essays by his present and past colleagues as well as some of his students was presented to him on this occasion. As a separate booklet, *A Bibliography of John Dewey*, containing a list of all his writings, has been brought out by M. H. Thomas and H. W. Schneider, with an introductory essay by the latter on "John Dewey's Empiricism" (Columbia University, xxi + 151 pp.).

A collection of Dewey's publicistic writings entitled *Characters and Events* (Holt) has appeared in two volumes, in connection with the Dewey festivities, under the editorship of J. Ratner.

ASSOCIATIONS AND MEETINGS

American Philosophical Association.—Owing to the spread of the American Philosophical Association, or perhaps its division to meet the geographical circumstances, a good many more philosophical papers are the outcome than was the case a number of years ago. At the annual meeting of the Western Division of American Philosophical Association (which is now in its fourteenth year) held at the University of Cincinnati, March 28-30, De Witt H. Parker read the presidential address "On the Notion of Value."

The Twenty-ninth annual meeting of the American Philosophical Association (Eastern and Western Divisions in joint session) took place at Columbia University on December 30 and 31. Most of the papers dealt with problems in logic, the theory of value, the implications of the new physics and epistemology. A full session was devoted to the philosophy of John Dewey in addition to the papers which discussed his theory of judgment and his educational philosophy. The presidential addresses were delivered by M. R. Cohen and M. C. Otto.

Philosophical Activity in Ohio.—The philosophy section of the Ohio College Association has been taking energetic measures of late to foster an interest in the philosophical disciplines in the State of Ohio with its forty-five universities and colleges. An elaborate program is being planned for the meeting of this section next April at the Ohio State University.

Philosophical Union of the University of California.—Oct. 24, Prof. A. A. Bowman, of the University of Glasgow, addressed the Union of the University of California at Los Angeles, taking for his theme "The Philosophical Approach to the Problem of Immortality." On December 5, in honor of John Dewey's seventieth anniversary, Dr. E. C. Moore, Director of the University of California at Los Angeles, spoke on "John Dewey's Contribution to the Philosophy of Education." Sir John Adams of the University of London led the discussion.

OBITUARY

Prof. R. M. Wenley.—Since the last review appeared in print, the death occurred of Prof. R. M. Wenley, of the University of Michigan, at the age of 67. Prof. Wenley represented a type of thinking infrequently found now-a-days among academic philosophers. He did not belong to the metaphysical schools, and perhaps for this reason his influence was restricted to those who came in close contact with him, but as a humanist, as a reflective mind of the untechnical variety, he takes his place among those in the first row of American thinkers and philosophers.

Dr. Morton Prince.—Although not primarily a philosopher, Dr. Prince, whose death occurred on the eve of the opening of the International Congress of Psychology, since his student days at the medical school evinced a lively interest in the problems of philosophy, espousing the doctrine of psychical monism in his first book, *The Nature of Mind.* In his last book, *Clinical and Experimental Studies in Personality* (Sci-Art, Cambridge, Mass., xvi + 559 pp.) which appeared early in 1929, two chapters are devoted to the problem of body and mind.

PSYCHOLOGY

By Wilbur S. Hulin

Professor, Princeton University

INTERNATIONAL CONGRESS OF PSYCHOLOGY

First American Meeting.—The Ninth International Congress of Psychology was held at Yale University during the week of Sept. 1 to 7, the first occasion America has acted as host to one of the international meetings. The acceptances of previous invitations presented by William James in behalf of American psychologists had been postponed due to the death of Professor James and later to the World War. The present Congress occurred on "the fiftieth anniversary of the birth of scientific psychology" (*Cf.* A. T. Poffenberger, *Jour. Phil.*, Nov., 1929), and was the largest group of psychologists ever assembled. The total attendance was 1,051 of which 123 were foreigners. There were 22 psychologists from England, including C. Spearman; among the 17 from Germany were Köhler, Stern, Wirth, Klemm; heading the 10 from Soviet Russia was Pavlov the famous leader of the reflex school; G. Kafka was among the 8 from The Netherlands; there were 6 from India; the 5 from Austria included the Bühlers, from France included Piéron, from Switzerland included Claparéde; among the 4 from Belgium was Michotte; among the 3 from Italy were Ponzo and Kiesow; Rubin represented Denmark; there were also 5 from Japan, 4 from Poland, 2 from China, and 1 each from Australia, Brazil, Egypt, New Zealand, Norway and Spain. The American members, coming from 42 states, Canada, Mexico and Porto Rico, were headed by the 196 from New York.

The Congress was held under the auspices of the American Psychological Association whose annual meeting was merged with that of the Congress. James McKeen Cattell was elected president of the Congress by the A. P. A.

The Program.—The general scheme of the program committee was to obtain papers from the largest possible number of members, in order that the proceedings should present a true idea of the present status and tendencies of psychology throughout the world. To carry out this plan, it was arranged to have twenty-five papers by invitation in the morning sessions and numerous symposia in the afternoon, with papers eight minutes in length. The evenings were devoted to lectures by a selected number of distinguished men. There were usually three parallel sessions in the morning, and from five to seven parallel symposia in the afternoon. There were seventy-four papers listed in the morning sessions, and 350 in the symposia (*Cf.* H. S. Langfield, *Science*, Oct., 1929).

Presidential Address.—The outstanding evening address was that given by K. S. Lashley, president of the American Psychological Association, on the subject of the "Basic Neural Mechanism of Behavior" (*Psych. Rev.*, Jan., 1930). Professor Lashley said that both the older theory of strict brain localization and the more recent theory of specific reflex arcs are inadequate because a wide variety of stimuli may elicit the same learned response, or a given learned response may be carried out through various patterns of individual movements. The brain is only organized into a relational framework capable of mass excitation rather than the conduction of individual reflex paths." Prof. Lashley's conclusions were based upon his experimental work which has been published in his *Brain Mechanisms and Intelligence* (Univ. Chicago Press, 1929).

OTHER MEETINGS

The Southern Society for Philosophy and Psychology met at the University of Kentucky March 29-30. C. N. Rexroad presented a paper on the reasons why college students take courses in psychology, and he reported that superficial curiosity was not the dominant motive. M. Meyer, in a paper on his auditory theory, stated that the cochlea functioned differently for high than for low tones.

Midwestern Psychological Association.—The fourth annual meeting was held at the University of Illinois, May 10-11. C. A. Ruckmick spoke on emotions, H. Klüver on mescal illusions, Higginson on the behavior of rats in a rotated maze, etc.

PSYCHOPHYSICS AND SENSORY PSYCHOLOGY

Experimental Problems.—N. V. Scheidemann's manual on *Experiments in General Psychology* has offered some gratifying innovations to the usual laboratory exercises (Univ. Chicago Press, 1929). W. S. Foster has collaborated with M. A. Tinker in publishing a revised edition of his *Experiments in Psychology* (Holt, 1929). Psychophysicists will enjoy H. M. Walker's *Studies in the History of Statistical Method* (Williams & Wilkins, 1929). E. S. and F. R. Robinson have worked out a simple and basic set of data in the realm of differential psychology which may serve as a norm for more complicated applied problems: "A Simple Series of Abilities" (*Amer. Jour. Psych.*, Jan., 1929). W. N. Kellogg has described a "Graphic Method in Psychophysics" by which the results are obtained through the use of a Stoelting kymograph (*ibid.*, July, 1929). The general problem of sensation has still remained a debatable one as is seen in H. M. Johnson's article, "Did Fechner Measure 'Introspectional' Sensations?" (*Psych. Rev.*, July, 1929). W. N. Kellogg has also revived an old problem, namely, that of "An Experimental Comparison of Psychophysical Methods" (*Arch. Psych.*, May, 1929).

Vision.—Considerable work was done during 1929 on the subject of vision. Mrs. Ladd-Franklin has published a volume of her collected papers under the title, *Colour and Colour Theories*; there are also chapters on recent discussions of other critics (Harcourt, Brace, 1929). An amusing review of this book is to be found in F. Birren's article, "The Ladd-Franklin Blues" (*Psych. Rev.*). F. L. Dimmick and C. H. Holt have found that to naïve observers gray is a unique experience, distinct from other color experiences: "Gray and the Color Pyramid" (*Amer. Jour. Psych.*, April, 1929). Dimmick also has attempted a "Reinterpretation of the Color-Pyramid" (*Psych. Rev.*, Jan., 1929). S. W. Terman has proposed "A New Classification of the Red-Green Color-Blind" (*Amer. Jour. Psych.*, April, 1929). G. Goodman has reported a persistent after-effect, "An Image of Spectacle Rims," when the spectacles have been removed (*ibid.*, July, 1929). H. Helson has demonstrated several types of visual experiences which are alleged to have been aroused from "Direct Stimulation of the Blind-Spot" (*ibid.*). M. A. Snyder has shown some evidence that cone vision may be impaired with the rod vision remaining normal in her "Experimental Study of Color-Blindness" (*ibid.*). In "A Quantitative Consideration of the Purkinje Phenomenon" of ocular adaptation to light, W. T. M. Forbes has attempted to indicate the possible number of photochemical substances existing in the human retina; he believes there are three processes, and possibly a fourth (*ibid.*, Oct., 1929). T. Karwoski has found that visual after-images are specifically correlated with the brightness of the light simultaneously fatiguing the eye, and are complementary in hue only under particular circumstances: "Variations in the After-Image" (*ibid.*). E. Thelin and E. R. Altman have sought to make an "Identification of Monocular Functions" as distinct from the vision obtained with both eyes open (*Jour. Exp. Psych.*, Feb., 1929). People generally use but one eye at a time in normal binocular vision according to the results found in W. R. Miles' study of "Ocular Dominance Demonstrated by Unconscious Sighting," as for example when one cups their hands before their eyes so that they really are seeing with one eye only, but do not realize this (*ibid.*, April, 1929). C. E. Ferree and G. Rand have continued their highly technical researches with a demonstration of the positive agreement between the "Intensity of Light and Speed of Vision" (*ibid.*, Oct., 1929).

Audition.—M. Upton has found some support for a resonance theory of hearing in his production of "Functional Disturbances of Hearing in Guinea Pigs After Long Exposure to an Intense Tone" (*Jour. General Psych.*, Oct., 1929). Another attempt to solve the controversial subject of "Tonal Attributes and Frequency Theories of Hearing" has been experimentally worked upon by G. Grundlach (*Jour. Exp. Psych.*, June, 1929). A useful means of "Measuring Auditory Intensive Thresholds in Electrical Units" has been described by W. N. Kellogg (*ibid.*). E. G. Wever has experimentally studied "Beats and Related Phenomena Resulting from the Simultaneous Sounding of Two Tones" (*Psych. Rev.*, Sept. and Nov., 1929).

Touch.—R. W. Gilbert has sought further evidence for specificity of function in the relation between "Dermal Sensitivity and the Diffentiated Nerve-Terminations of the Human Skin" and has concluded that the classic variety of nerve endings is probably less complicated than has been assumed (*Jour. General Psych.*, Oct., 1929). W. B. Gilman and K. M. Dallenbach have tested the "Formula for the Intensive Gradation of Heat" which had previously been devised for the measurement of thermal sensitivity (*Amer. Jour. Psych.*, July, 1929). W. S. Hulin has developed "A Simplified Electromagnetic Aesthesiometer" to be used in testing tactual pressure sensation for small, precise intervals of time (*ibid.*). G. I. Swetlow has described his treatments for the relief of unyielding pain by means of alcohol nerve block: "Pain" (*Psychiat. Quar.*, 1929).

PERCEPTION

C. O. Weber and K. M. Dallenbach have demonstrated that the "Properties of Space in Kinaesthetic Fields of Force," *i.e.*, space as sensed by the muscles, especially when under load, is in many respects, a non-Euclidian space (*Amer. Jour. Psych.*, Jan., 1929). L. E. Cole has made a study of average and constant errors under different types of procedure in "The Localization of Tactual Space" (*Genetic Psych. Monog.*, Jan.-June, 1929). In his continued study of "The Relative Rôles of the Temporal and the Intensive Factors in Sound Localization" O. C. Trimble has determined that with high pitched sounds the intensity factor is much more effective (*Amer. Jour. Psych.*, Oct., 1929). N. R. F. Maier has found that in "The Illusion of Size in Pin-Hole Vision" one can change the apparent size by a voluntary change in lens accommodation (*ibid.*, April, 1929). F. L. Dimmick and R. W. Sanders have determined three kinds of attitudes in "The Perception of Visual Movement" which give rise, respectively, to 'inferred movement,' 'apprehended movement,' or actual 'visual movement' (*ibid.*, Oct., 1929). J. P. Guilford and H. Helson have found an inverse relation between the occurrence of "Eye Movements and the Phi Phenomenon" (*ibid.*). C. P. Heinlein has tested the effects of "Area, Color, and Brightness Difference in a Reversible Configuration" (*Jour. General Psych.*, Oct., 1929). B. L. Rosenbloom has demonstrated that similar principles are effective in the "Configurational Perception of Tactual Stimuli" as exist for vision, *e.g.*, closed figures are more easily perceived than open figures (*Amer. Jour. Psych.*, Jan., 1929). J. J. Gibson has worked out in a systematic and thorough manner some of the subjective tendencies found in "The Reproduction of Visually Perceived Forms"; these experiments are in line with the configurational principles (*Jour. Exp. Psych.*, Feb., 1929). In comparing "The Relative Potency of Color and Form Perception at Various Ages" C. R. Brian and F. L. Goodenough have found younger children reacting more discriminately to form (*Ibid.*, June, 1929). H. Griffith has made a study in prose rhythm based upon voice records: "Time Patterns in Prose" (*Psych. Monog.*, no. 179, 1929).

IMAGERY AND MEMORY

In her book on *Creative Imagination*, J. E. Downer has summarized the results of her study in the psychology of literary genius (Harcourt, Brace, 1929). S. J. Holmes has described some interesting "Freaks of Creative Fancy" (*Psych. Rev.*, Sept., 1929). W. H. Barton has prepared a workmanlike handbook on *The Nature and Direction of Learning* (Appleton, 1929). E. J. Swift has offered a new theory, along with criticisms of older theories, of "The Learning Process" (*Psych. Rev.*, Jan., 1929). In the learning process J. A. McGeoch has found that retroactive inhibition varies inversely to the number of presentations of the material to be learned: "Degree of Learning and Retroactive Inhibition" (*Amer. Jour. Psych.*, April, 1929). From the examination by A. D. Friedberg, K. M. Dallenbach and E. L. Thorndike of compositors' errors they found that "The Influence of Repetition" is that of causing omissions of intermediate letters in words, or theoretically, to cause the omission of intermediate terms in a learned series (*ibid.*, Oct., 1929). By use of the card sorting method L. W. Crafts has contributed another piece of evidence that the "whole" method of learning is superior in the comparison of "Whole and Part Methods With Non-Serial Reactions" (*ibid.*). C. C. Miles and L. M Terman believe they have shown "Sex Differences in the Association o Ideas" in that the male shows a slightly greater indifference and superficiality (*ibid.*, April, 1929).

ATTENTION AND AFFECTION

In a series of experiments on "Attention-Automatization" A. Ford ha shown that one's attention become more fixed to a task as one become habituated to the given situatio thus showing a biological adaptiveness in attention (*ibid.*, Jan., 1929) A. F. Brown has found that heter geneous chromatic stimuli arouse smaller "Range of Visual Apprehen sion" than do homogeneous chromati stimuli (*ibid.*, Oct., 1929). J. C Beebe-Center has performed a long careful series of psychophysical test on the relative affective values odors, treated individually and ser ally, and from his results he ha proposed a "Law of Affective Equilibrium" which states that "the affective value of the experiential correlate of a stimulus varies conversely with the sum of the affective values of those experiences preceding this correlate which constitute with it a unitary temporal group" (*ibid.*, Jan., 1929). In "An Experiment on Affective Contrast" A. J. Harris has substantiated Center's "Law" (*ibid.*, Oct., 1929). R. M. Chaney and A. R. Lauer have found a definite "Influence of Affective Tone on Learning and Retention" (*Jour. Educ. Psych.*, April, 1929). F. L. Wells has found that, as in the field of vision, the "Reaction-Time to Affects Accompanying Smell Stimuli" are shorter than one second in time (*Amer. Jour. Psych.*, Jan., 1929). C. Landis has reported a further study on "The Interpretation of Facial Expressions in Emotion" (*Jour. General Psych.*, Jan., 1929). M. J. Adler has built up an experimental approach to the measurement of "Musical Appreciation" (*Arch. Psych.*, Sept., 1929). H. Lowery has expressed the belief that mere technique may be overemphasized in the "Fundamental Considerations in the Study of Musical Ability" (*Jour. Educ. Psych.*, Nov., 1929).

PHYSIOLOGICAL PSYCHOLOGY

H. Fletcher, long known for his work on stuttering, has compiled a book on *Speech and Hearing* (Van Nostrand, 1929). C. J. Herrick has added to his writings about neurological psychology with his book, *The Thinking Machine;* he has assumed that man has a conscious as well as a physiological side (Univ. Chicago Press, 1929). One of the most important contributions during the year has been the large and well illustrated work on *The Autonomic Nervous System* by A. Kuntz (Lea and Febiger, 1929). W. B. Cannon has made a timely revision and enlargement of his well known volume on *Bodily Changes in Pain, Hunger, Fear and Rage* (Appleton, 1929). L. M. Terman and J. C. Almack have made a survey and suggestive source of advice on *The Hygiene of the School Child* (Houghton Mifflin, 1929). A Forbes has found that all skeletal muscle contraction is of one type, also that there is no evidence of a special "Tonus in Skeletal Muscle in Relation to Sympathetic Innervation" (*Arch. Neur. and Psychiat.*, Aug., 1929). J. C. Fox, Jr., and R. Dodge have continued the series of researches on "Optic Nystagmus" with an excellent photographic study, using the technique and skill for which Professor Dodge has long been noted (*ibid.*, July, 1929). Using photographs of eye movements, R. C. Travis has shown the presence of pursuit movements occurring as a result of "Reciprocal Inhibition and Reënforcement in the Visual and Vestibular Systems" (*Jour. Exp. Psych.*, Oct., 1929). In "Some Observations on Experimentally Produced Convulsions," F. H. Pike, C. A. Elsberg, W. S. McCullouch and A. Rizzolo have attempted to determine the localization of the motor mechanisms from which the typical clonic movements of epilepsy arise (*Amer. Jour. Psychiat.*, Sept. 1929). M. N. Chappell has been able to detect from "Blood Pressure Changes in Deception" the distinction between truth and deception with 87% accuracy (*Arch. Psych.*, April, 1929). Articles of psychological interest which have appeared during 1929 in the *Physiol. Rev.* are those by M. Hines "On Cerebral Localization" (July), and by F. C. Lee on "The Regeneration of Nervous Tissue (Oct.), and also by W. N. Klietman on "Sleep" (Oct.). C. W. Darrow has used galvanometric, pneumographic and other records to demonstrate the immediacy of "Electrical and Circulatory Responses to Brief Sensory and Ideational Stimuli" (*Jour. Exp. Psych.*, Aug., 1929).

PSYCHOPATHOLOGY

W. C. Olson has made a welcome advance upon the problem of incipient neurosis in his Institute of Child Welfare monograph, "The Measurement of Nervous Habits in Normal Children." One of the greatest needs in psychopathology is the detection of the first signs of mental disorder (Univ. Minn. Press, 1929). J. Kasanin and M. R. Kaufman have prepared "A Study of the Functional Psychoses in Childhood" in which an analysis is given of the environmental factors which led to the disturbances observed (*Amer. Jour. Psychiat.*, Sept., 1929). B. Low has done another small popular treatise, the present one being called *Psycho-Analysis and Education* (Harcourt, Brace, 1929). From a medical doctor's viewpoint has come a treatise by W. S. Sadler on the tricks and deceptions of the subconscious, called *The Mind at Mischief* (Funk and Wagnalls, 1929). W. A. White has made an interpretation of "The Social Significance of Mental Disease" (*Arch. Neur. and Psychiat.*, Nov., 1929). I. S. Wechsler has compiled a worthwhile treatise on *The Neuroses* (Saunders, 1929). An obscure but serious problem has been reported by G. H. Estabrooks in "Suggestions as to the Detection and Treatment of Personality Difficulties in College Students" (*Ment. Hygiene*, Oct., 1929). Among the many articles that have been published jointly by P. A. Witty and H. C. Lehman is one on "Nervous Irritability and Genius" (*Jour. Abn. and Soc. Psych.*, April, 1929). C. B. Strickler has helped to determine in his "Quantitative Study of Post-Hypnotic Amnesia" the limits to which this phenomenon has extended (*ibid.*, April, 1929).

CURRENT PUBLICATIONS

The Foundations of Experimental Psychology, edited by C. Murchison (Clark Univ. Press, 1929), has been presented as a handbook containing special articles by many of the world's leading authorities on psychology and allied subjects. The book probably is at present the most useful individual volume on the current status of experimental psychology. Its contents are: "The Mechanism and Laws of Heredity," by T. H. Morgan; "The Study of Living Organisms," by W. J. Crozier; "The Mechanisms of Reaction," by A. Forbes; "Vision," by L. T. Troland, and by S. Hecht; "Hearing," by H. Banister and H. Hartridge; "The Chemical Senses," by G. H. Parker and W. J. Crozier; "The Sense of Feeling," by J. P. Nafe; "Space and the Non-Auditory Labyrinth," by J. Q. Holsopple; "Hunger and Thirst," by W. B. Cannon; "Emotion," by P. Bard, and by C. Landis; "Learning," by K. S. Lashley and W. S. Hunter; "The Individual in Infancy," by A. Gesell; "The Individual in School," by R. Pintner and F. N. Freeman; "The Adult in the Community," by M. A. May; "The Conflict and Survival of Cultures," by C. Wissler; "The Abnormal Individual," by S. I. Franz; "General Statistical Principles," by T. L. Kelley and E. Shen.

Reviews and Indexes.—*Psychological Abstracts* has increased its number of reviews, but as yet this periodical has not adequately catalogued the field of psychology as does the *Psychological Index* (which for 1928 listed 5,487 titles of articles and books). The *American Journal of Psychology* has prepared an index of its first thirty volumes (1887-1919). C. Murchison has compiled a *Psychological Register* giving the names of the world's recognized psychologists. A good summary of recent accomplishments has been made in the article by H. P. Longstaff and J. P. Porter on "Objective Measures of Ability and Achievement in General Psychology" (*Jour. Appl. Psych.*, April, 1929).

Configurationism.—W. Köhler, who may be considered a leader of configuration psychology in America as well as in Germany, has published a new general statement of his *Gestalt Psychology* (Liveright, 1929). Configurationism has incurred a critical handling by F. H. Lund in his article "The Phantom of the Gestalt" (*Jour. General Psych.*, April, 1929).

HISTORIES OF PSYCHOLOGY

E. G. Boring has depicted with an excellent critical perspective *A History of Experimental Psychology* in which the author has hastened through the earlier centuries of science and has devoted his attention to a thorough discussion and evaluation of modern theoretical schools of psychology and also to the accomplishments of the experimentalists of the last fifty years, especially those in the field of psychophysics (Century, 1929). G. Murphy has written *An Introduction to Modern Psychology* (Harcourt, Brace, 1929) which deals more with the general problems of educational and applied psychology. Murphy's book contains a supplement on "Contemporary German Psychology," by H. Klüver. W. B. Pillsbury also has written a *History of Psychology* which savors more of the older philosophical treatment (Norton, 1929).

Texts.—R. H. Wheeler has presented *The Science of Psychology* from the viewpoint of an "introspective behaviorist" (Crowell, 1929). R. S. Woodworth has revised his widely used *Psychology* and has continued to maintain his dynamic point of view (Henry Holt, 1929). E. S. and F. R. Robinson have also revised and added to their *Readings in General Psychology* (Univ. Chicago Press, 1929). C. N. Rexroad has made an interesting combination of behavioristic and applied psychology in his *General Psychology for College Students* (Macmillan, 1929).

General.—T. L. Kelley, the statistician, has pondered on the nature and social importance of modern research in his book, *Scientific Method, Its Function in Research and Education* (Ohio State Univ. Press, 1929). This essay is not very technical, and it should be helpful in showing the inevitable necessity of dealing with any problem, physical, personal or spiritual, in the cautious and impersonal manner which alone has made possible modern science. F. A. Cleveland's *Modern Scientific Knowledge of Man, Nature and Society* has appeared as a still more popular book (Roland Press, 1929). From a philosophical point of view, S. P. Lamprecht has discussed the distinction between "Sense Qualities and Material Things" as set forth by "Dualism *versus* Natural Realism" (*Phil. Rev.*, Jan., 1929). A scholastic treatise on *The Training of the Will* has been published by J. Lindworsky, S. J. (Bruce, 1929). W. McDougall has given further expression to his "hormic theory" in *Modern Materialism and Emergent Evolution* (Van Nostrand, 1929). L. T. Troland has entered upon an abstruse and speculative set of works called *The Principles of Psychophysiology* (Van Nostrand, 1929). J. H. Ewen has offered *Aid to Psychology* (Wood, 1929). J. B. Watson and W. McDougall have jointly published their controversial lectures under the title, *The Battle of Behaviorism* (Norton, 1929). In an extensively circulated questionnaire on "The Summum Bonum," A. E. Davis found that ideals were largely determined by individual environmental influences (*Jour. Soc. and Abn. Psych.*, April, 1929). Concerning some of the academic aspects of psychology there has appeared D. S. Hill's investigation of the "Control of Psychology in State Universities" in which he found that a considerable confusion of psychology with philosophy and education departments still exists (*Psych. Bull.*, Oct., 1929); T. Arnett has asked the question, "Should Professors' Salaries Be Higher?" and has answered that the salary scale should be extended at the upper end, so as to attract and hold the valuable and higher type specialists (*Bull. Assoc. Univ. Professors*, Oct., 1929).

SOCIOLOGY

By Frank H. Hankins

Professor, Smith College

SOCIOLOGICAL ORGANIZATION AND LITERATURE

American Sociological Society.—The twenty-fourth meeting was held at Washington, Dec. 27-30, 1929. The officers for the year were: W. F. Ogburn, University of Chicago, president; Howard W. Odom, University of North Carolina, first vice-president; Edwin H. Sutherland, University of

Minnesota, second vice-president; Ernest W. Burgess, University of Chicago, secretary-treasurer. The central topic was "The Rural Community." There were division and section meetings on social psychology, educational sociology, rural sociology, the community, sociology and social work, the family, the sociology of religion, the teaching of sociology and statistics. Full report, will be made in the *Publications* of the society, for 1929.

Publications and Membership.—The Society assumed the publication of selected papers from Vol. XXII of the *Publications* as a separate volume, edited by Prof. Ernest W. Burgess, under the title, *Personality and the Social Group.* The Society is represented by one or more members in seven national organizations: the Social Science Research Council, the American Council of Learned Societies, the National Council for the Social Studies in the South, the *Encyclopædia of the Social Sciences*, the *Dictionary of American Biography*, THE AMERICAN YEAR BOOK, and the *Journal of Social Science Abstracts.* Its membership during the previous year increased from 1140 to 1352.

Encyclopedia of the Social Sciences.—Work was vigorously prosecuted during 1929 under the editorship of Prof. E. R. A. Seligman of Columbia University and the managing editorship of Dr. Alvin Johnson, Director of the New School for Social Research. Serving in an advisorial capacity are American representatives of the following fields: anthropology, economics, education, history, law, philosophy, political science, social psychology, sociology and statistics. There are eleven foreign advisory editors for England, France, Germany, Italy and Switzerland. All articles are assigned to experts and will be signed by them, although the topics, space and general content are determined at the editorial offices at Columbia University. The contributors are chosen from all countries. The editorial staff includes, besides the editors and advisors mentioned, twelve experts and a score of assistants. Plans call for the printing of the first volume late in 1929 or early in 1930. The work, which will take several years to complete, will comprise fifteen volumes and will be published by The Macmillan Company. About half of the first volume will be devoted to introductory material, including a history of encyclopedia-making and of the social sciences from the Greeks to the present time, the teaching of the social sciences here and abroad, and an annotated bibliography of the greater contributions to ten different fields of the social studies.

Social Science Abstracts.—The enormous growth of periodical literature in the social sciences during recent years has made urgent some service whereby students in special fields can keep in touch with the researches done throughout the world on their particular and related problems. As early as 1919 the American Sociological Society created a Committee on Social Abstracts with Professor F. Stuart Chapin as chairman. *The American Journal of Sociology* subsequently published numerous abstracts and organized a special abstract service. With the organization of the Social Science Research Council great impetus was given to the launching of a special journal devoted exclusively to abstracts. The Laura Spelman Rockefeller Memorial made a grant for this purpose of $500,000 to be available over a period of ten years, not more than $65,000 to be used in any one year. A board of directors, including one representative from each of seven societies, was placed in charge. An editorial staff, with Professor Chapin as Editor-in-Chief, W. I. Brandt and Robert M. Woodbury as associate editors, and a number of assistant editors, was created. Plans were completed.

The first number of *Social Science Abstracts* issued in March, 1929. Over 2600 journals in all languages were listed, divided roughly as follows: Human Geography, 361; Cultural Anthropology, 77; History, 600; Economics, 700; Political Science, 637; and Sociology, 332. These are published in twenty-three languages. It was expected that the completion of the list would add one or two thousand more journals to the above total.

One of the objects is to make available to readers of *Abstracts* all materials in all languages, much of which has heretofore been inaccessible to American and European students because of language difficulties. Titles of contributions to all journals in a large list are typed on special slips and sent to experts whose abstracts are published over their own names. In addition about 200 magazines of special technical character or printed in inaccessible languages are assigned as wholes to chosen reviewers. Moreover, a number of research institutes in Europe have agreed to supply regularly abstracts of little known journals accessible to them. All abstracts are confined strictly to matter found in the assigned article; no critical comment is permitted. Cross references are supplied in each number, as well as a classified table of contents and an index of authors. About 15,000 articles were abstracted for the first volume. At the end of the year will be published a cumulative index of authors together with an elaborated and systematic subject index as a separate issue. Besides this annual index number there will be twelve issues annually. Though the first number was not issued until March, 1929, twelve issues for 1929 were made, so as to make the volumes harmonize with the calendar years. Beginning with the second volume it is hoped that facilities may be found for the abstracting of books and monographs. The editorial offices are at 611 Fayerweather Hall, Columbia University. The subscription price is $6.00 per volume.

CO-OPERATIVE RESEARCH IN THE SOCIAL SCIENCES

Research Tendencies.—The rapid progress of research in the social sciences has brought forward an increasingly urgent need of coöperation among persons working in related fields. Progress in the application of scientific techniques has involved an increasing degree of specialization, which in turn has necessitated the development of means of maintaining fruitful contacts among experts who are otherwise in danger of losing themselves in narrow specialisms. The sociological field has tended to break up into a number of major divisions each with its own minor sections; at the same time a broader sociological viewpoint has tended to permeate the fields of biology, psychology, law and medicine. Latterly the efforts both to encourage research and to maintain a basis for sympathetic understanding, as also for the synthesizing of research results, have brought into existence a number of notable organizations.

Social Science Research Council.—This is a body designed primarily to promote research and the development of research talent in the various social sciences. It includes three representatives from each of seven learned societies in the fields of economics, political science, sociology, anthropology, psychology, statistics and history. It has established new headquarters at 230 Park Avenue, New York City. It promotes conferences on social research, maintains a considerable number of committees on special problems, supports a number of fellowships, and gives grants-in-aid for the completion of researches already begun. It was largely responsible for the launching of the *Social Science Abstracts*, and it is promoting plans for giving wider publicity to findings in the social sciences. In the spring of 1929 it awarded 27 research fellowships distributed as follows: anthropology, 3; economics, 5; history, 6; political science, 3; psychology, 3; sociology, 3; geography, 1; law, 2; miscellaneous, 1. These fellowships are available to any one holding the Ph.D. degree or its equivalent, resident in the United States or Canada, and not over thirty-five years of age. Some exceptions to these conditions are made. The fellowships are granted as a rule for one year, but occasionally for shorter periods, and may be renewed. Their amount varies with the individual conditions affecting each grant. Awards are made in January or February to approved applications which must be received before Dec. 1. The fellowship year begins July first following. In addition the Council grants variable sums for the completion of researches already under way. These grants-in-aid are given only when need is demonstrated and plans for the completion of the study are clear. They are available, not merely annually as in the case of the fellowships, but at each meeting of the Council.

American Council of Learned Societies.—This body is composed of representatives from seventeen learned societies. Among other activities it is promoting the publication of the *Dictionary of American Biography*, research in American Indian languages, a study of linguistic and national stocks in the American population, and various less pretentious studies. It announced the receipt of $90,000 for the support of fellowships in the humanistic studies, $40,000 to be available during 1930-31 and the remainder during 1931-32. In addition the Council has available for grants-in-aid, support of projects and administration, $75,000 for 1929-30, $100,000 for 1930-31 and $105,000 for 1931-32. It is offering in each of the years 1929-1931 a limited number of grants-in-aid to individual scholars to assist in the advancement of researches in the humanistic sciences of philosophy, philology and literature, linguistics, art and archæology, and history. These grants are made to mature scholars for travel, personal and secretarial assistants, equipment, and other necessities. Grants are restricted to scholars who are citizens of the United States or permanently domiciled therein, and they are limited in amount to $300. Applications should be addressed to Waldo G. Leland, permanent secretary, 907 Fifteenth St., Washington, D. C.

Dictionary of American Biography.—The first volume of this work, promoted jointly with the *New York Times* Company, appeared in November, 1928. Two additional volumes were published during 1929.

Other Enterprises of the Council.—Another enterprise of the Council is the compilation, in coöperation with the American Library Association and the National Research Council, of a list of the serial publications of foreign governments. Jointly with the Social Science Research Council it is compiling a directory of American societies, institutes and other bodies devoted to the humanistic and social sciences. It is undertaking to preserve printed source materials that are in danger of early destruction because of the poor quality of the paper on which they are printed. During the year it began the promotion of research and education in the history and science of music. Two societies admitted to membership during the year were the Society of Biblical Literature and Exegesis and the Bibliographical Society of America. The Council recently issued a list of periodicals in the humanistic and social subjects published in the United States, compiled by Dr. Leo F. Stock. The list comprised 215 titles, distributed as follows: geography, 5; anthropology and folklore, 4; oriental studies, 5; philosophy, 6; psychology, 13; philology, 24; archæology and numismatics, 4; political science, 6; international law and relations, 2; law, 43; economics, 11; history, 62; religion, 7; fine arts, 14; and sociology, 9.

Officers for the year were: Edward C. Armstrong, Princeton University, Chairman; William A. Hammond, Cornell University, Vice-Chairman; William E. Linglebach, University of Pennsylvania, Secretary-Treasurer; Edwin F. Gay, Harvard University, and Edgar E. Sturtevant, Yale University, members of the executive committee.

Institute of Human Relations at Yale University was the outcome of a suggestion made in 1926 by the Yale University Medical School for a research institute dealing with problems of human behavior in such a way as to combine the viewpoints of investigators in a number of different fields. Its plan called for the bringing together, in a new building, of the Institute of Psychology, which included psychologists and an anthropologist, and the Department of Research in Child Hygiene, and the addition of work in psychiatry. About the same time the Yale Law School desired to enlarge the contacts of its students with the humanistic sciences, including biology, psychology, economics, political science and sociology. Funds for building and research for a number of years were advanced, largely by the Rockefeller Foundation, in January, 1929. An executive committee of the Institute of Human Relations was then formed, with Prof. Donald Slesinger of the Law School as executive secretary and included the President, the Deans of the Medical, Law and Graduate Schools, and the Chairman of the departments of Psychology and Social Science. The Institute is to function as an exclusively graduate and research organization. It is designed to cut across departmental exclusiveness and to encourage the greatest possible coöperation among all experts interested in the problems under investigation. It is acknowledged to be in a formative and experimental stage. The first study undertaken under its authorization is that of family factors in child adjustment under the direction of Dr. William Healy and Dr. Augusta F. Bronner. This project will be carried on simultaneously at Boston and New Haven.

Institute for Research in the Social Sciences at the University of Virginia was made possible by a grant from the Laura Spelman Rockefeller Memorial of $27,000 annually to June 30, 1931. The fields of study include economics, government, sociology, history, rural social economics, psychology, philosophy and related subjects. While considerable attention is being given to Virginia problems, the researches include matters of broader scope. The following studies by members of the faculty have been completed: *A Statistical Study of Virginia*, by Wilson Gee and J. J. Corson, III; *Public and Private Welfare, Roanoke, Virginia*, by F. W. Hoffer; *A Comparative Study of the Public Welfare System of Virginia*, by F. W. Hoffer; *Rural Migration in Certain Tidewater and Piedmont Areas of Virginia*, by Wilson Gee and J. J. Corson, III; *Distribution of Tax Burden in Virginia*, by T. R. Snavely and W. H. Stauffer; *Augusta County Public Welfare*, by F. W. Hoffer; *The Fundamental Objectives and Methods of Research in the Social Sciences*, a series of lectures edited by Wilson Gee (The Macmillan Company). A number of other volumes are in preparation.

The Society for Social Research of the University of Chicago held its eighth annual Institute for Social Research, July 15-20, 1929. Results of researches covering varied fields of sociological study were presented by investigators from all parts of the country.

POPULATION PROBLEMS

Eugenics.—The post-war period has been marked by an increasing interest in various questions relating to the quantity and quality of the American population. The eugenic aspects of immigration, the relative fertility of the various national and racial stocks in the country, and the significance of the birth control movement have been much discussed. Rapid progress has been made in arousing popular interest and in promoting legislation. One important suggestion of eugenic advocates has been adopted in more than twenty states; namely: the sterilization by surgical means of habitual criminals or mental defectives. Some of these laws are compulsory and some are voluntary; their constitutionality has been upheld by the United States Supreme Court. A study of the effects of sterilization in some thousands of cases was published by E. S. Gosney and Paul Popenoe, *Sterilization for Human Betterment* (Macmillan).

The American Birth Control League held a National Conference at the Hotel Astor, Nov. 18-20, 1929, under the presidency of Mrs. F. Robertson Jones. Delegates were present from state and local organizations from all parts of the country, except the south. Sessions were devoted to social welfare, health, morals and religion, race improvement, and clinical and legislative aspects. The session was notable for a mass meeting addressed by Rev. Harry E. Fosdick, Rabbi Stephen S. Wise, and Rev. Henry Darlington. Reports indicated that clinics presided over by one or more physicians are now functioning in a number of cities. The League is agitating in favor of legislation giving physicians the right to give contraceptive information where health or welfare seem to demand it. A committee led by Mrs. Margaret Sanger is preparing a proposed modification of the Federal legislation affecting birth control. The League publishes the monthly *Birth Control Review* at 104 Fifth Avenue, New York City.

The National Interracial Conference comprising eighteen national social service and interracial organizations, aided by a subsidy from the Social Science Research Council, met at Washington, D. C., December 16-19, 1928. The primary aim of the conference was to develop approaches to the problems of Negro life and adjustment through factual data. There were about two hundred delegates present representing social work and religious organizations, foundations, research bodies, Federal bureaus, and educational institutions. The basis of discussion was furnished by a *Data Book* representing more than a year's work of a committee headed by Graham R. Taylor and Charles S. Johnson. In this were assembled statistical and other materials relating to Negro health, population problems, industry and agriculture, housing, education, law observance and enforcement, recreation, citizenship and race relations. Mary van Kleeck of the Russell Sage Foundation served as chairman, George E. Haynes as secretary, and E. C. Carter of *The Inquiry* as technical assistant in the conduct of the discussions. This Conference met for discussion and voted to discontinue itself when its proceedings were published.

ANTHROPOLOGY AND ETHNOLOGY

By Clark Wissler

Curator, Department of Anthropology, American Museum of Natural History

EARLY MAN

Ireland.—The search for early man shows no flagging of interest. The quest now seems to be shifting from Europe to Asia, Africa, and even to America. In Europe, however, we note a discovery in Ireland which seems to show once for all that man lived there during the Ice Age. The find was made by E. K. Tratman in Kilgreany Cave, South Ireland. The importance of this find lies in that, whereas satisfactory evidence of man's presence in Ireland during glacial time was wanting, there can now be no reasonable doubt, thus indicating that Ireland was inhabited along with the other British Isles.

South Africa.—There has been reported the discovery in South Africa of an ancient skull which seems to link the Bushmen with prehistoric times, even to indicating the presence of their ancestors in late paleolithic times.

Palestine.—The discoveries of Miss Dorothy Garrod are striking. Working in a cave near Mt. Carmel, Palestine, she found evidences of Cro-Magnon man falling between historic man and the Neanderthal stage marked by the skull of Galilee discovered by her in 1926. Perhaps the most striking result was to find an overlapping of early and late stone ages in the same culture, suggesting that the historical development of man in Palestine was not quite the same as in Europe.

Iraq.—Later in the season, Miss Garrod, accompanied by Dr. G. G. MacCurdy of Yale University, located numerous relic-bearing caves northeast of Bagdad. One cave in particular yielded artifacts of the Aurignacian period, especially comparable to the contemporary cultures of the Danube valley. Again the stratified deposits of this cave revealed a transition in culture directly from the Aurignacian level to the Tardenoisian, skipping the Solutrean and Magdalenia. Another cave was found to have housed Neanderthal man and so represents a still earlier period of occupation. The general result of the year's work in Iraq suggests that the region was inhabited in paleolithic times by cultures at least analogous to those of Europe.

China and Russia.—From China comes the claim that "Pekin Man," announced in 1926, is now shown to be one of the earliest, if not the earliest, type of fossil man, this form appearing to be intermediate to simian forms. Of still more sensational character is the announcement from Russia that two fossilized human brains have been discovered, assumed to be of paleolithic age; if true, this is a very important discovery.

America.—It remains but to comment on the discoveries relating to the antiquity of man in America. At Bishop Gap, Arizona, human bones were found deeply buried and intimately associated with the remains of extinct animals of late pleistocene times. There is no reasonable doubt as to the finding of these bones together, but it still remains to demonstrate that they were contemporaneous in life. In Florida, Dr. Gridley reports further finds of artifacts along with the bones of mastodons. In Colorado Richard M. Snodgrasse, following up the traces of "Folsom Man," described in last year's report, located sites in sand hills where the Folsom type of implement was found.

NEOLITHIC RESEARCH

Europe.—Progress has been made in neolithic research in the Old World. In England Miss Liddell discovered a new method by which early neolithic pottery was decorated, designs produced by the joints of bird bones used as stamps. In certain swamps in Sweden, a complete neolithic village was discovered, the preservation of buildings and artifacts being comparable to that in Swiss Lake dwellings. Again near Vienna, a village site was discovered believed to date about 4000 B. C.

Ur and Kish.—Of about equal antiquity, but representing a more advanced state of culture are the discoveries at Ur, the remarkable find being that of a gold headdress worn by the queen of Shub-ad. In addition, many other fine objects of gold and copper were unearthed, giving a clear idea of the culture of the time. Also, at Kish were recovered inscriptions that date from about 4200 B. C. and prove to be Sumerian in type.

India.—Ancient India yielded examples of writing also reminiscent of Sumerian. These finds at least date from 3500 B. C. and from the objects obtained it appears that a relatively high state of civilization existed there also.

Mexico.—Turning to the New World, in which the greatest activities were in Mexico, we note progress in the study of Maya art. It was also announced that the ancient Maya were skilled in dentistry to the extent of drilling holes in teeth and filling them with metal. Mirrors were found for the first time in early Mayan sites. In Mexico proper, the research supported by the Government revealed important stone carvings at Tenayuca and stratigraphic researches indicated that this site had been occupied continuously since the Archaic period.

Chile.—In South America an Inca site is reported from northern Chile at a place called Copiapo, indicating an Inca invasion of the territory.

ARCHAEOLOGICAL SURVEYS IN THE UNITED STATES

Archaeological investigations in the United States are too numerous to list in full. Notable progress seems to have been made in state surveys, especially in Ohio, Indiana, Illinois. A conference on the problems of state archaeology in the Mississippi drainage was held in St. Louis under the auspices of the National Research Council at which steps were taken for a closer coördination of state activities. The large museums and research institutions of the country have been active in southwestern United States, where the main objective is the determination of chronological sequences by stratigraphic methods. The main outline of this chronology having been determined previously, the task now is to fill in the details. The close of the season was marked by another general conference on the subject conducted by A. V. Kidder, attended by all the investigators interested in this field and resulting in a crystallization of results, a conference unique in the history of anthropology in America. Note should be taken of the entrance of Colonel Charles A. Lindbergh into the field of aerial exploration, a method previously used in the Old World. Lindbergh flew over certain areas in Yucatan, observing and photographing ruins, detecting in the course of a few days the true distribution of Maya ruins.

ETHNOLOGICAL STUDIES

Australasia.—In the study of living tribes, some progress has been made. In Melanesia and Australia, the only part of the world in which wild peoples are still to be found, a number of investigations are under way. Dr. Hortense Powdermaker, of London University, has been for some months in New Ireland. Dr. Margaret Mead Fortune, of the American Museum of Natural History, accompanied by her husband, R. H. Fortune (Cambridge), investigated child life among the Manus tribes in the Admiralty Islands. Miss Beatrice Blackwood, demonstrator in ethnology at Oxford University, is in the Solomon Islands engaged in a study of the primitive family group. Gregory Bateson, who holds a research studentship of Cambridge University, has lived for more than a year among the Bainings and the Sulkas in New Britain, and will soon leave for the Sepik to continue his investigations there. Chinnery is engaged in social studies among the natives of New Ireland and Kieta. In Australia a number of studies are carried on under the auspices and leadership of Radcliffe Brown.

American Indians.—For the New World many studies of American Indian tribes are under way, among which may be mentioned a concentrated study of certain tribes in northern Arizona under the leadership of A. L. Kroeber, and linguistic studies of the Navajo led by Edward Sapir. Among the new types of investigations that have been made may be mentioned a study of Menomini adjustment to white culture by Felix M. Keesing.

MENTAL TESTS AND MEASUREMENTS

By Frank N. Freeman

Professor, University of Chicago

TYPES OF ACTIVITY

The emphasis in the field of mental tests swings back and forth between two types of activity. One line of activity consists in developing new tests; the other consists in the interpretation of the results of mental tests and the attempt to derive from them a theory of the constitution of mental abilities. To borrow a figure from military operations, psychologists alternate between the advancement of their lines in the conquest of new territory and the consolidation of their positions in territory which has already been acquired. Thus, in the nineties a good many tests were invented and given, chiefly to college students, but little study was made of the technique of testing or the nature of the abilities which were tested. In the first decade of this century the procedure and assumptions of mental testing were subjected to a limited amount of criticism. But this criticism was soon overshadowed by the preoccupation with the familiar Binet Scale and with the group tests which were given so extensively in the army during the war and in the schools and colleges following the war. These are the so-called intelligence tests. The interest is now swinging back. For the time being, at least, the major concern with these tests centers in the analysis of their results so as to derive a theory of mental abilities.

INVESTIGATION AND THEORY

Two-factor Theory.—Much of the controversy which goes on concerning the nature of intellectual ability, and many of the investigations which are being made, deal with rather technical questions and with detailed aspects of the theories. The first clear-cut theory in the field was advanced by Charles Spearman in 1904. In its developed form this theory came to be known as the Two-factor Theory. According to this theory each mental ability is made up of two parts or factors, a general factor, which is the same in nature in all abilities, and one or more special factors, of which there are a great many, all quite different and unrelated to each other. The general factor is popularly identified with general intelligence, but it is more abstract than this in the conception of the author of the theory. This theory is supported by rather abstruse study of the coefficients of correlation, which express the closeness of relation between pairs of abilities.

Multiple Factor Theory. — Over against the Two-factor Theory it has been customary to set a Multiple Factor Theory, a theory that intelligence is represented by a sort of average of the composite of a large number of distinct abilities. This theory has never been so explicitly formulated as the other and it is doubtful whether it is held by any prominent psychologist. Thorndike, to whom it has been ascribed, has recently argued for the view that differences in general intellectual ability exist, and that they are due to the number of associations between ideas which the person is capable of making. The chief difference between Spearman and Thorndike on this matter of general intelligence, then, does not concern its existence but rather concerns its nature. Spearman regards differences in intelligence as due to differences in the amount of energy of the brain.

ABILITY TESTS

Individual Variations.—The present debate is partly of a purely mathematical nature. It relates to highly technical questions which only expert statisticians can grasp. We cannot go into the minutiae of the arguments but must be content with the statement that psychologists now pretty generally agree that individuals differ in general intellectual ability, and that they also differ in other abilities, such, for example, as keenness of vision, keenness of hearing, and possibly quickness of movement or reaction. What the nature of general ability is, or how many and what the nature of the special abilities are would not be agreed upon. These are the subjects of current investigation.

Prevailing Types.—As has been remarked, not many new intelligence tests have appeared within the past year, and those which have appeared are built along the general lines of the tests with which we are familiar. The two prevailing types are Binet's age scale and the point scales which can be administered to groups of persons at a time. The best known adaption of the Binet Scale in America is the Stanford Revision and the best known example of the group point scale is the Army Alpha. A few tests of one or the other of these two types have been produced during the past year for use with persons of a given nationality or a given age or station in life. Most of the tests, perhaps all of them, are somewhat dependent on the background of experience of the person being tested, and tests therefore are sometimes adapted to particular groups.

Vocational Tests.—The special factors which were mentioned in connection with the theories of abilities are usually thought of as abstract elements, not corresponding to the particular abilities required to perform some concrete task. Conceived in the latter sense, however, special abilities have been measured, and new tests to measure them are being produced from time to time. These tests are designed, more often than not, for vocational guidance. Several new tests for prediction of success in the study of music have been produced recently. Another form of vocational test is the interest blank, which is being used to differentiate fitness for different occupations.

PERSONALITY TESTS

Behavior and Attitudes.—While the profession is now more occupied with the analysis of ability than with devising new tests of ability, the same cannot be said of tests of personality. These are much newer than are tests of ability. The first prominent and well-organized scale to measure any phase of temperament was the Downey Will Profile, published in 1919. This was followed in 1920 by Pressey's scale for measuring emotions. Some years earlier several persons had used tests of ethical discrimination; but in 1921 Vollker introduced methods of testing ethical behavior. During the past few years many scales and tests have been produced to test general attitudes, attitudes toward institutions, toward particular social groups, attitudes of ascendance *versus* attitudes of submission, attitudes of open-mindedness *versus* attitudes of prejudice, and so on.

Studies.—A number of studies of tests of personality or attitude have been made during the past year. Some of these studies are for the purpose of measuring the reliability or validity of the existent tests. Some of these tests, unfortunately, are not so consistent and do not agree so well with other measures of the traits in question as do ability tests. It is necessary, then, to make studies in standardization in order to find the weaknesses of these newer types of tests, and, if possible, to discover means of overcoming them. In some cases the purpose is to try out the usefulness of one of the new tests in meeting some practical problem.

Sociability in Children.—Other studies report the first try-outs of new tests. We may select one of these for brief description. It is a test of sociability in elementary-school children, devised by Jui-Ching Hsia. This, like most other tests in the field, is a measure of comprehension of what should be done in social situations rather than a measure of actual behavior. It is generally recognized that a test of what a person actually does when he is confronted with a social situation would be a better indication of his sociability than a statement of what he says he thinks should be done under given circumstances. But it is difficult to create natural social situations experimentally, whereas it is easy to give a test of comprehension in the form of language. Hence the predominance of the language-type test. In the present case the test consists of 71 questions, each followed by four answers. The child is to tell which of the four is the best. Two examples will illustrate the method.

	Score
What would you do,	
if somebody laughs at your clothes?	
1. Tell him to shut up..........	—2
2. Laugh at his	0
3. Ask him what is wrong with your clothes	1
4. Tell him to mind his own business	0
if somebody jeers at you after you have just been punished?	
1. Tell him that it is not nice.....	1
2. Never mind	1
3. Sock him in the eye	—1
4. Do the same to him when he is punished	0

The responses are scored according to the numbers after the answers. The scores on this test were found to agree reasonably well, in the fifth and sixth grades, with the judgments of the teachers and of fellow pupils.

Diversity of Tests.—Tests of character or temperament have been resorted to because it was discovered that achievement in school and in life is determined not alone by ability, but also by other characteristics which we group vaguely under the head of personality. Effort is now being directed toward probing the various aspects of personality by means of a diversity of tests. Some analysis of personality must be made as a preliminary step in the construction of tests, but this analysis is not the main objective. The time may be at hand when attention will be shifted from the tests themselves to theories of personality, just as attention was shifted from tests of ability to theories of the nature of ability. There is, of course, a well-known physiological theory which accounts for personality on the ground of the activity of the ductless glands. What is needed, however, is a psychological theory, based on and harmonious with the numerous facts which are being assembled by means of the psychological tests.

INHERITANCE AND ENVIRONMENT

Home Influence.—One of the larger questions which relates to both ability and personality is the perennial question of nature and nurture, or inheritance and environment. It is extraordinarily difficult to obtain crucial evidence on this problem. The studies which have been made during the current year have added to the accumulated data but have contributed little to the solution of the problem. They bring out the fact, for example, that children from superior homes are abler than children from inferior homes, or that children in rural schools are less intelligent than children in urban schools. But neither of these facts indicates whether the difference is due to native constitution or to culture. Only in cases of similar culture but different grade of inheritance or of similar grade of ancestry but different culture can the weight of the two factors be estimated. The studies of mental tests during the present year do not provide this type of discrimination. The question still remains very incompletely answered.

Mental Growth.—Mental tests may also be used as a means of tracing the course of mental development in the child and adult. A few studies during the past year have added to our knowledge of this subject. They show, for example, that increase in intellectual power is fairly uniform throughout the period of childhood and youth, instead of being very rapid in early childhood and slowing down greatly in later childhood and youth. However, this question is still the subject of controversy. It appears, also, that intellectual growth does not cease at thirteen or fourteen years of age, as was thought from the returns of the army tests, but continues to the age of twenty or beyond. These and simliar facts regarding mental growth are important for educators to know.

COGNATE SOCIETIES

American Genetic Assn., 306 Victor Bldg., Washington, D. C.

American Philosophical Society, 104 S. 5th St., Philadelphia, Pa.

American Psychiatric Assn., Albany, New York.

American Psychopathological Assn., 520 Commonwealth Ave., Boston, Mass.

American Social Science Assn., 280 Madison Ave., N. Y. C.

American Society for Psychical Research, 15 Lexington Ave., N. Y. C.

American Sociological Society, 58th St. and Ellis Ave., Chicago, Ill.

Encyclopedia of the Social Sciences, 100 Morningside Drive, New York City.

National Committee for Mental Hygiene, 370 Seventh Ave., New York City, N. Y.

Psychological Corporation, 25 W. 39th St., New York City.

PART SEVEN
THE HUMANITIES

DIVISION XXV
LITERATURE AND LANGUAGE

HISTORY, BIOGRAPHY, AND TRAVEL

BY ARTHUR M. SCHLESINGER

PROFESSOR, HARVARD UNIVERSITY

HISTORY

General.—The historiography of the year cannot be considered apart from biographical literature, for historical writers showed a marked disposition to study the past as it was mirrored in the lives of individuals. History of the more generalized kind was, however, well represented in the year's publications. Of brief manuals of American history there were S. E. Morison, *An Hour of American History* (Phila.: Lippincott), highly readable and provocative; S. L. Cook, *Torchlight Parade* (N. Y.: Minton), a colorful account of Presidential campaigns; and W. M. West, *History of the American Nation* (N. Y.: Ronald), emphasizing the growth of democracy. Of the longer coöperative works, R. H. Gabriel, ed., *The Pageant of America* (15 vols., New Haven: Yale), came to a close with the issuance of Volumes II, XIV and XV; and one new volume was added to the four already issued of A. M. Schlesinger and D. R. Fox, eds., *A History of American Life* (12 vols., N. Y.: Macmillan): H. I. Priestley, *The Coming of the White Man, 1492-1848.*

Special Studies.—Of a more special character were: M. W. Jernegan, *The American Colonies, 1492-1750* (N. Y.: Longmans), a marvel of condensation, especially valuable for its treatment of social phases; G. L. Kittredge, *Witchcraft in Old and New England* (Cambridge: Harvard), scholarly and distinguished; E. B. Greene and R. B. Morris, *A Guide to the Principal Sources for Early American History in the City of New York* (N. Y.: Columbia), covering the years 1600-1800; V. W. Crane, *The Southern Frontier, 1670-1732* (Durham: Duke), a work of fine scholarship; Mary M. P. Stanard, *The Story of Virginia's First Century* (Phila.: Lippincott), a rapidly moving narrative; C. H. Van Tyne, *The War of Independence* (Boston: Houghton), the second volume of what promises to be a notable trilogy; E. J. Warwick and H. C. Pitz, *Early American Costume* (N. Y.: Century), dealing with the period 1607-1820; W. C. Abbott, *New York in the American Revolution* (N. Y.: Scribner), mainly a literary contribution; M. E. Curti, *The American Peace Crusade, 1815-1860* (Durham: Duke), a definitive study, relating American efforts to similar movements abroad; J. G. Van Deusen, *Economic Bases of Disunion in South Carolina* (N. Y.: Columbia); U. B. Phillips, *Life and Labor in the Old South* (Boston: Little), a product of long study and reflection; Samuel Klaus, ed., *The Milligan Case* (N. Y.: Knopf), the first volume in a series recording famous American trials; T. R. Hay, *Hood's Tennessee Campaign* (N. Y.: Neale), an authoritative study; Ella Lonn, *Desertion during the Civil War* (N. Y.: Century), based on wide researches; C. G. Bowers, *The Tragic Era* (Boston: Houghton), a dramatic account of reconstruction with a Democratic bias; N. J. Ware, *The Labor Movement in the United States, 1860-1895* (N. Y.: Appleton), scholarly and impartial; and D. L. McMurry, *Coxey's Army, 1893-1898* (Boston: Little, Brown), the first adequate treatment.

Frontier themes were dealt with in: Flora Warren, *The Story of the Red Man* (N. Y.: Longmans), and W. C. McLeod, *The American Indian Frontier* (N. Y.: Knopf), both popular accounts; Sydney Greenbie, *Frontiers and the Fur Trade* (N. Y.: Day), journalistic; C. A. Vandiveer, *Fur Trade and Early Western Exploration* (Cleveland: Clark); A. B. Hulbert, *Frontiers* (Boston: Little, Brown), an evaluation of the pioneer spirit; W. J. Ghent, *The Road to Oregon* (N. Y.: Longmans), a valuable chronicle of the great emigrant trail; and E. S. Osgood, *The Day of the Cattleman, 1845-1890* (Minneapolis: Univ. Minn.), an accurate and detailed study.

War-time and post-war history was treated in: C. H. Grattan, *Why We Fought* (N. Y.: Vanguard); W. B. Clark, *When the U-Boats Came to America* (Boston: Little); W. D. Hines, *War History of American Railroads* (New Haven: Yale), a straightforward account by a former director-general; D. P. Locklin, *Railroad Regulation since 1920* (N. Y.: McGraw); W. F. Ogburn, ed., *Recent Social Changes in the United States since the War and Particularly in 1927* (Chicago: Univ. Chicago), short studies by specialists; and Committee on Recent Economic Changes, *Recent Economic Changes in the United States* (2 vols., N. Y.: McGraw-Hill), a series of analyses under the general editorship of E. F. Gay and W. C. Mitchell.

Economics and Business.—Long-range studies of economic and business phenomena were offered by the following volumes: V. S. Clark, *History of Manufactures in the United States* (3 vols., N. Y.: McGraw-Hill), a revision and completion of a standard work; F. S. Presbrey, *History and Development of Advertising* (Garden City: Doubleday); C. B. Kuhlman, *Development of the Flour-Milling Industry in the United States* (Boston: Houghton), carefully documented; N. F. Hoggson, *Epochs in American Banking* (N. Y.: Day); Edward Hungerford, *The Story of the Batlimore and Ohio Railroad* (2 vols., N. Y.: Putnam); and Agnes C. Laut, *The Romance of the Rails* (2 vols., N. Y.: McBride), chatty but comprehensive.

Urban history was treated from a variety of viewpoints, as illustrated by Jane De F. Shelton, *Salt-Box House* (N. Y.: Scribner), an intimate sketch of eighteenth-century life in a New England hill town; Charles Moore, *Washington, Past and Present* (N. Y.: Century); R. S. Lynd and Helen M. Lynd, *Middletown* (N. Y.: Harcourt), comparing conditions in an Indiana town thirty years ago with the findings of a present-day corps of investigators; C. E. Merriam, *Chicago* (N. Y.: Macmillan), a revealing account by a distinguished public servant; and Lloyd Lewis and H. J. Smith, *Chicago* (N. Y.: Harcourt), emphasizing the bizarre and dramatic features of the city's history.

American colleges and universities were dealt with historically in: S. E. Morison, ed., *Tercentennial History of Harvard College* (Cambridge: Harvard), the first issued volume of what promises to be a monumental history; Christina Baker, *The Story of Fay House* (Cambridge: Harvard), tracing the history of Radcliffe's oldest building; C. H. Rammelkamp, *Illinois College* (New Haven: Yale), a detailed centennial record; E. M. Coulter, *College Life in the Old South* (N. Y.: Macmillan), the early years of the University of Georgia; and C. Z. Klauder and H. C. Wise, *College Architecture in America* (N. Y.: Scribner), an historical survey.

Other Historical Phases.—Other phases of intellectual and artistic history were discussed in: F. L. Mott, *History of American Magazines, 1741-1850* (N. Y.: Appleton), based on wide researches; and G. C. D. Odell, *Annals of the New York Stage* (N. Y.: Columbia), Volumes III and IV, continuing his minute record through the years 1821-1843. Religious development was the theme of G. C. Loud, *Evangelized America* (N. Y.: Dial), a history of evangelism; L. M. Jones, *Quakers in Action* (N. Y.: Macmillan), their humanitarian activities in war-time and post-war Europe; and A. B. Bass, *Protestantism in the United States* (N. Y.: Crowell), a canvass of present-day conditions.

International.—America's international situation was studied from various angles in B. H. Williams, *The Economic Foreign Policy of the United States* (N. Y.: McGraw-Hill), a reference work of basic importance; Samuel Crowther, *The Romance and Rise of the American Tropics* (Garden City: Doubleday), a rapid survey; C. L. Jones and others, *The United States and the Caribbean* (Chicago: Univ. Chicago), presenting varying viewpoints; H. N. Denny, *Dollars for Bullets* (N. Y.: Dial), a vivid summing up of American rule in Nicaragua; J. F. Rippy and others, *Mexico* (Chicago: Univ. Chicago), Mexican-American relations considered from three different viewpoints; W. C. Forbes, *The Philippine Islands* (2 vols. Boston: Houghton), a valuable account by an upholder of Republican imperialism; Hugh Keenleyside, *Canada and the United States* (N. Y.: Knopf), impartial and thorough; and J. F. Rippy, *The Rivalry of the United States and Great Britain over Latin America, 1808-30* (Balt.: Johns Hopkins). Other international interests were given historical treatment in such books as: J. H. Ralston, *International Arbitration, from Athens to Locarno* (Stanford: Univ.); D. H. Miller, *The Peace Pact of Paris* (N. Y.: Putnam), a study of the Briand-Kellogg treaty; and J. T. Shotwell, *War as an Instrument of National Policy* (N. Y.: Harcourt), discussing the Paris pact against its historical background.

Foreign.—Among the more noteworthy works by Americans dealing with foreign countries were: J. W. Angel, *The Recovery of Germany* (New Haven: Yale); Hugh Quigley and R. T. Clark, *Republican Germany* (N.Y.: Dodd); H. D. Sedgwick, *France* (Boston: Little, Brown); L. R. Gottschalk, *The Era of the French Revolution* (Boston: Houghton); W. E. Lunt, *History of England* (N. Y.: Harper), a textbook; L. G. Ragatz, *The Fall of the Planter Class in the British Caribbean, 1763-1833* (N. Y.: Century); R. N. Baldwin, *Liberty under the Soviets* (N. Y.: Vanguard); E. T. Williams, *Short History of China* (N. Y.: Harper); and K. S. Latourette, *History of Christian Missions in China* (N. Y.: Macmillan).

BIOGRAPHY AND AUTOBIOGRAPHY

Dictionary of American Biography.—Judged by the deluge of biographical publications, a large section of the American public continued to believe with Emerson that "there is no history, only biography." American writers preferred American subjects, but distributed their choices among figures in a wide variety of fields. The "psychographic" approach was less stressed than in previous years. The monumental and catholic *Dictionary of American Biography* (N. Y.: Scribner) reached its third volume under the editorship of Allen Johnson, maintaining the high standards set by the first two.

Other Collective Works.—The notable coöperative series, *American Secretaries of State and Their Diplomacy* (10 vols., N. Y.: Knopf), edited by S. F. Bemis, came to a close with the appearance of the last two volumes. Of other collective biographical works the most noteworthy perhaps were: C. K. Bolton, *The Real Founders of New England* (Boston: Faxon), dealing with the settlers who preceded the great Puritan migration; P. A. Bruce, *The Virginia Plutarch* (2 vols., Chapel Hill: Univ. N. C.), setting forth the lives of thirty-three famous Virginians; Gamaliel Bradford, *As God Made Them* (Boston: Houghton), vivid and sympathetic portraits of prominent Americans of the mid-nineteenth century; Joseph Hergesheïmer, *Swords and Roses* (N. Y.: Knopf), containing charming sketches of nine Civil War figures; E. L. Sabin, *Wild Men of* *the West* (N. Y.: Crowell), a rapid-fire account of frontier figures; J. W. Wise, *Jews Are Like That!* (N. Y.: Brentano), sympathetic studies of nine prominent contemporary American Jews; John Cournos, *Modern Plutarch* (Indianapolis: Bobbs), an inadequate treatment of leading personages of the Nineteenth Century; C. W. Thompson, *Presidents I've Known and Two Near Presidents* (Indianapolis: Bobbs), a personal record covering the last third of a century: and Beckles Willson, *America's Ambassadors to England* (N. Y.: Stokes), well-written sketches covering the period since 1785.

American Statesmen and Others.—Nearly every important American statesman received treatment by the authors of the year, thus reminding one that each generation must write its own biography as well as its own history. Generally speaking, however, such works were concerned with reinterpretation rather than with the discovery of new facts. Among the more significant were: Shelby Little, *George Washington* (N. Y.: Minton); Rupert Hughes, *George Washington* (N. Y.: Morrow), Volume III; Brand Whitlock, *La Fayette* (2 vols., N. Y.: Appleton); Thomas Boyd, *Mad Anthony Wayne* (N. Y.: Scribner); John Pell, *Ethan Allen* (Boston: Houghton); Dorothy Bobbé, *Abigail Adams* (N. Y.: Minton); Gilbert Chinard, *Thomas Jefferson* (Boston: Little); G. W. Johnson, *Randolph of Roanoke* (N. Y.: Minton); David Karsner, *Andrew Jackson* (N. Y.: Brentano); A. L. Benson, *Daniel Webster* (N. Y.: Cosmopolitan); D. T. Lynch, *An Epoch and a Man* (N. Y.: Liveright), Martin Van Buren; Allan Nevins, ed., *Polk: The Diary of a President* (N. Y.: Longmans); R. P. Warren, *John Brown* (N. Y.: Payson); W. E. Barton, *Lineage of Lincoln* (Indianapolis: Bobbs); Raymond Holden, *Abraham Lincoln* (N. Y.: Minton); Lloyd Lewis, *Myths After Lincoln* (N. Y.: Harcourt); Elizabeth B. Cutting, *Jefferson Davis* (N. Y.: Dodd); Allan Tate, *Jefferson Davis* (N. Y.: Minton); A. D. Turnbull, *Commodore David Porter* (N. Y.: Century); L. P. Stryker, *Andrew Johnson* (N. Y.: Macmillan); and H. J. Eckenrode, *Rutherford B. Hayes* (N. Y.: Dodd).

Recent Figures.—Men prominent in the more recent political era also occupied the pens of biographers as evidenced by such volumes as Thomas Beer, *Hanna* (N. Y.: Knopf), impressionistic but valuable; M. R. Werner, *Bryan* (N. Y.: Harcourt), patronizing; Paxton Hibben and C. H. Grattan, *The Peerless Leader* (N. Y.: Farrar), another portrait of Bryan; J. A. Russell, *Joseph Warren Fordney* (Boston: Stratford), concerned mainly with his legislative career; T. B. Mott, *Myron T. Herrick* (Garden City: Doubleday); W. F. Johnson, *George Harvey* (Boston: Houghton), based on Harvey's personal papers; P. H. Love, *Andrew W. Mellon* (Balt.: Coggins); Calvin Coolidge, *Autobiography* (N. Y.: Cosmopolitan); and Alfred E. Smith, *Up to Now* (N. Y.: Viking), an informal and revealing autobiography.

Frontier figures were dealt with in Frederick Palmer, *Clark of the Ohio* (N. Y.: Dodd), a popular presentation of George Rogers Clark; Marquis James, *The Raven* (Indianapolis: Bobbs), a popular biography of Sam Houston; Adela E. R. Orpen, *Memories of Old Emigrant Days in Kansas* (N. Y.: Harper), recalling the exciting days of 1862-65; O. P. White, *A Frontier Mother* (N. Y.: Minton), reciting experiences in Colorado sixty years ago; Hunter Frazier, *Custer* (N. Y.: Cosmopolitan), dramatic but not alway veracious; and Harriet C. Brown, *Grandmother Brown's Hundred Years* (Boston: Little), the life story of a centenarian who grew up with Ohio and Iowa.

Business Leaders.—Among the books dealing with business leaders the following may be noted: A. D. H. Smith, *John Jacob Astor* (Phila.: Lippincott), excellent; Broadus Mitchell, *William Gregg* (Chapel Hill: Univ. N. C.), a scholarly study of an ante-bellum Southern industrialist; J. R. Perkins, *Trails, Rails and War* (Indianapolis: Bobbs), a somewhat uncritical biography of G. M. Dodge; J. K. Winkler, *John D.* (N. Y.: Vanguard), a lively portrait of the elder

Rockefeller; Charles Merz, *And Then Came Ford* (Garden City: Doubleday), setting forth Ford's business career and influence on his times; and W. H. Irwin, *The House That Shadows Built* (Garden City: Doubleday), the life story of Adolph Zukor, the motion-picture magnate.

Science and engineering were represented by E. A. Muschamp, *Audacious Audubon* (N. Y.: Brentano), a judicious life of the naturalist; Jonathan Leonard, *Loki* (Garden City: Doubleday), a readable account of C. P. Steinmetz; F. L. Dyer, T. C. Martin and W. H. Meadowcraft, *Edison* (2 vols., N. Y.: Harper), the standard life brought down to date; and J. B. Bishop, *Goethals* (N. Y.: Harper).

Labor Leaders.—Two types of labor leadership were portrayed in Elsie Glück, *John Mitchell, Miner* (N. Y.: Day), sympathetic and informative; and W. D. Haywood, *Bill Haywood's Book* (N. Y.: International), a grim personal chronicle of forty years.

Litterateurs.—Next to statesmen, literary personages received most attention from biographers. Of particular interest were J. E. Flitcroft, *The Novelist of Vermont* (Cambridge: Harvard), a scholarly study of Daniel Pierce Thompson; Phillips Russell, *Emerson* (N. Y.: Brentano), a new account of the "wisest American"; Newton Arvin, *Hawthorne* (Boston: Little), interpretative and critical; Lewis Mumford, *Herman Melville* (N. Y.: Harcourt), thoughtful and fluent; F. O. Matthiessen, *Sarah Orne Jewett* (Boston: Houghton), brief but illuminating; C. H. Grattan, *Bitter Bierce* (Garden City: Doubleday), mainly analytical; A. D. De Castro, *Portrait of Ambrose Bierce* (N. Y.: Century), eulogistic; Anne R. Burr, *Weir Mitchell* (N. Y.: Duffield), his life and letters; Jacob Zeitlin and Homer Woodbridge, *Life and Letters of Stuart P. Sherman* (2 vols., N. Y.: Farrar); and Sidney Cox, *Robert Frost* (N. Y.: Holt), a sketch by an intimate friend.

The Theater.—Various arts of the theater found reflection in M. J. Moses, *The Fabulous Forest* (Boston: Little), dealing with Edwin Forest; W. S. Hart, *My Life East and West* (Boston: Houghton), a breezy autobiography of a motion-picture actor; Eddie Cantor, *My Life Is in Your Hands* (N. Y.: Harper), amusing patter; and Howard Thurston, *My Life of Magic* (N. Y.: Dorrance), forty years as a magician.

Fine Arts.—Probably the chief biographical works in the field of fine arts were: Elizabeth S. Kite, ed., *L'Enfant and Washington* (Balt.: Hopkins), a documentary collection; Charles Moore, *The Life and Times of Charles Follen McKim* (Boston: Houghton); and Carl Sandburg, *Steichen, the Photographer* (N. Y.: Harcourt).

Educational leaders were treated in Harriet C. Rhees, *Laurenus Clark Seelye* (Boston: Houghton), a charming account of the first president of Smith College: Alma Lutz, *Emma Willard* (Boston: Houghton), including many letters; and Helen H. Thom, *Johns Hopkins* (Balt.: Hopkins), an outline sketch. Religious leaders had their innings in Agnes Repplier, *Père Marquette* (Garden City: Doubleday), chiefly of literary importance; Katherine A. Porter, *The Devil and Cotton Mather* (N. Y.: Liveright), mainly about the latter; W. L. Duren, *Francis Asbury* (N. Y.: Macmillan); C. C. Sellers, *Lorenzo Dow* (N. Y.: Minton), vivid and veracious; and E. F. Dakin, *Mrs. Eddy* (N. Y.: Scribner), detailed and judicious.

Social Service.—The field of social service was represented by H. E. Wilson, *Mary McDowell, Neighbor* (Chicago: Univ.), portraying a Chicago social worker among immigrants; Eleanor H. Woods; *Robert A. Woods* (Boston: Houghton), a documented account by his wife; and Herbert Asbury, *Carry Nation* (N. Y.: Knopf), colorful and appreciative.

European Figures.—Biographies of European figures were widely read, but most of them originated from abroad. Of those produced in America perhaps the most important were: Clement Wood, *King Henry the Rake* (Boston: Stratford), salacious; Katherine Anthony, *Queen Elizabeth* (N. Y.: Knopf); H. S. Gorman, *The Incredible Marquis* (N. Y.: Farrar), a colorful life of Dumas; Edward Wagenknecht, *The Man Charles Dickens* (Boston: Houghton); A. E. Zucker, *Ibsen, the Master Builder* (N. Y.: Holt); R. H. Schauffler, *Beethoven* (2 vols., Garden City: Doubleday); R. H. Fife, *Young Luther* (N. Y.: Macmillan); H. E. B. Speight, *Life and Writings of John Bunyan* (N. Y.: Harper); and Mary R. Andrews, *A Lost Commander: Florence Nightingale* (Garden City: Doubleday).

TRAVEL AND ADVENTURE

Near and Far East.—There was the usual grist of books dealing with foreign travel and adventure. John Dewey brought together in one volume his various *Impressions of Soviet Russia and the Revolutionary World* (N. Y.: New Republic), gathered during the last ten years. Cathay was responsible for the largest number of volumes, as may be judged from the following typical titles: R. C. Andrews, *Ends of the Earth* (N. Y.: Putnam); Owen Lattimore, *Desert Road to Turkestan* (Boston: Little); Mary Bradley, *Trailing the Tiger* (N. Y.: Appleton), mainly about India; Helen C. Wilson and Elsie R. Mitchell, *Vagabonding at Fifty* (N. Y.: Coward), from Siberia to Turkestan; Elizabeth Keith, *Eastern Windows* (N. Y.: Macmillan) by an artist; J. M. Ashton, *Ice-Bound* (N. Y.: Putnam), dealing with the Siberian Arctic; D. S. Haring, *The Land of Gods and Earthquakes* (N. Y.: Columbia), Japan; and J. C. Van Dyke, *In Java and the Neighboring Islands of the Dutch East Indies* (N. Y.: Scribner).

Africa was the center of interest in such works as S. K. Humphrey, *Loafing Through Africa* (Phila.: Penn); Isabel Anderson, *Circling Africa* (N. Y.: Jones); Grace Flandrau, *Then I Saw the Congo* (N. Y.: Harcourt); and J. H. Appel, *Africa's White Magic* (N. Y.: Harper).

Miscellaneous.—Of miscellaneous travel books, the following were representative: H. M. Kallen, *Frontiers of Hope* (N. Y.: Liveright), concerned with the prospects of the Jews in Palestine, Poland and Russia; A. F. Gilmore, *East and West of the Jordan* (Boston: Stratford), Palestine, Syria and Egypt; George Horton, *The Home of Nymphs and Vampires* (Indianapolis: Bobbs), the isles of Greece; Webb Waldron, *Blue Glamor* (N. Y.: Day), the Mediterranean; H. B. Turner, *Picturesque Old France* (Boston: Little); and Lincoln Ellsworth, ed., *Air Pioneering in the Arctic* (N. Y.: Nat. Amer. Soc.), the 1925 and 1926 polar flights of Amundsen and Ellsworth.

AMERICAN FICTION

By Amy Loveman

Managing Editor, *The Saturday Review of Literature*

GENERAL CRITICISM

The most notable fact in regard to the American fiction of the year 1929 is a negative one,—its lack of general distinction. With a large output of books, there have been few novels of genuine impressiveness, and hardly more that give promise of holding attention beyond the twelvemonth of their appearance. There has, to be sure, been much competent work—perhaps a higher general level of craftsmanship than in the past—but on the whole the most significant fiction which Americans have been reading has come from foreign sources rather than from their own countrymen. The year has, indeed, worn the aspect of a transitional period in American letters, a time when the bitterness which for a decade has lent driving force to literature has undergone change through the dilution of emotion with reason. The "younger generation" of the immediately post-war period, which found its world one of chaos and futility, has apparently worn off the edge of its disillusionment, while its followers, the still younger generation just beginning to make its mark in literature, give every evidence of having arrived at a less defeatist philosophy of life than their predecessors held. So much may be accounted to the good of American letters. But our fiction for the moment has lost in vigor if it has gained in balance, and though it is no longer rebellious or despairing, and is still earnest, thoughtful, and unafraid, it is not at the instant urgent or comprehensive.

BACKGROUNDS OF CURRENT FICTION

It is, on the other hand, increasingly interpretative of the American scene. Following in the path of such writers as Willa Cather, Sinclair Lewis, Glenway Wescott, Fannie Hurst, and Louis Bromfield, it has more and more concerned itself with the native background, deriving its setting alike from the rural districts and the cities, and selecting its characters from the criminal and the lower classes as well as in the higher ranks of society. There is less tendency to concentrate on the abnormalities and sores of the social organization, and more to see society in the round and in perspective than has been evident in recent years. Life is still depicted without gloss, with all its uglinesses and disappointments, but it is less likely to be painted without mitigation of its misery than it was a short time ago. Indeed, it is safe to say that the naturalistic novel has in the past year yielded something more of the already diminishing dominance it held at the outset of 1929, and that like it the novel of Freudian interpretation has shown a decline in numbers. The stress, to be sure, is still on the psychological novel, but it is the psychological novel that is concerned with emotion and motive as evidenced in conduct rather than with psycho-analysis that is making its way.

ROMANCE AND ADVENTURE

Coincidently with the interest in a realistic portrayal of contemporary civilization has been manifest an increasing swing toward the romantic and the historical novel and the story of adventure. The "cloak and dagger" romance has returned, and the historical tale, so completely sidetracked during the war period and the years immediately following upon it, is growing rapidly in numbers. As to the mystery and detective yarns, they have flourished like the green bay tree; indeed, popular interest in them has amounted to so great a fad, that the year 1929 would seem their heyday. What with Detective Story and Crime clubs disseminating them, magazines devoted to them, and a rapidity of production that inevitably means numerous stories of worse than mediocre quality, there are indications that this type of literature—if literature the major part of it can be called—has overshot the mark and is on the eve of suffering a reversal in popular favor.

A few volumes may be cited as representative of the general type. S. S. Van Dyne's *The Bishop Murder Case* (Scribners) and Frances Noyes Hart's *Hide in the Dark* (Doubleday, Doran) show sure craftsmanship and sustain their interest well. Nathalie Sumner Lincoln's *The Fifth Latchkey* (Appleton), *The Hidden Woman* (Dodd, Mead), by James Hay, Jr., and Harvey O'Higgins's *Detective Duff Unravels It* (Liveright) are typical of a large number of tales all more or less on the same model.

OUTSTANDING NOVELS

Sinclair Lewis.—Despite the fact that 1929 has uncovered much promising ability, the outstanding fiction of the year has come not from the novices but from the seasoned writers. Three novels stand out as of particular importance, the only three, perhaps, which can hold their own with the productions of immediately preceding years. Sinclair Lewis's *Dodsworth*, Ellen Glasgow's *They Stooped to Folly*, and Ernest Hemingway's *A Farewell to Arms* are all of them not alone significant social documents but excellent tales as well. Mr. Lewis in *Dodsworth* (Harcourt, Brace) shows a maturing of those powers which ripened in *Babbitt* from the photographic verisimilitude of *Main Street* to a larger truthfulness of characterization, and at the same time a continuance of that more sympathetic attitude toward his personalities which differentiated *Arrowsmith* from *Elmer Gantry.* He is still the satirist, of course, but in his portrayal of his millionaire automobile manufacturer who, having made his fortune, would set out by way of Europe and travel to win those imponderables of culture which he vaguely feels are of greater price than wealth and social position, his satire is mellowed to a sympathy that invests his hero with pathos and at times with something of tragedy. Like Mr. Lewis's earlier works *Dodsworth* will undoubtedly hold place in American literature as social history, for as well as the portrait of an individual it is a generic study of the far-flung tug-of-war between the American business man whose energies success releases for significant purposes, and his wife who, regarding herself as the custodian of culture, can find outlet for her attainments only in a social life that balks his higher intentions.

Ellen Glasgow.—At the other end of the pole from Sinclair Lewis as a satirist is Ellen Glasgow. Where he is violent or bitter, she is subtle and adroit. Never has the delicious quality of her prose, the neatness of her epigram, or the delicate thrust of her irony stood out to better advantage than in *They Stooped to Folly* (Doubleday, Doran). That novel, in the manner and mood of the earlier *The Romantic Comedians*, is a witty and effective portrayal of youth in rebellion against the fetters of convention and contemptuous of the hazards of life and a depiction of the changing codes of morality from Civil War days to the present.

Ernest Hemingway. — Totally removed in method and manner, as also in subject matter, from either of the other outstanding books of the year is Ernest Hemingway's *A Farewell to Arms,* (Scribners). Here is a striking and affecting document of war and love in war time, a narrative remarkable for the forcefulness of its stripped dialogue, the vividness of its descriptions, and the impact of its emotions. Under the guise of a realist, Mr. Hemingway is a profound romantic, that kind of a romantic whose quality is manifested by an inability, or an unwillingness, to give expression to sentiment. His tale of an American officer with the Italian engineering forces and the idyll of his love for the British nurse which began as a wartime incident and ended in profound tenderness and tragedy, is not only one of the most realistic descriptions of battle and retreat which the war has produced but a romance of moving quality.

War Novels.—In America, as in European countries, the portrayal of the war has forced its way prominently into fiction. Following in the wake of the enormous success of the German war novel, *All Quiet on the Western Front,* have come a number of tales which like it picture the conflict in the unvarnished starkness of reality. Such books as *God Have Mercy on Us!* (Houghton Mifflin) an enlisted man's account of experiences in the trenches, Mary Lee's *It's a Great War,* (Houghton Mifflin), the first novel to depict the part played by women in maintaining the men at the front, a long, outspoken, and vigorous work, transfused with an all-consuming sense of the futility of war, and *All Else Is Folly* (Coward-McCann), a picture of the struggle from the Canadian angle by a young Canadian, Peregrine Acland, have competence of execution, sincerity of purpose, and earnestness of emotion to recommend them.

THE SOUTH IN FICTION

But though the war has furnished the occasion for some of the most effective of the year's books, it is, as we said before, the American scene which has more largely engaged the attention of the writers of 1929. The South especially has come in for portrayal, having enlisted able pens in such works as Maristan Chapman's *Homeplace* (Viking), a story of the Tennessee mountains which successfully conveys the poetry as well as the grimness of life among a people whose speech is as flavorsome as their existence is narrow; Percy MacKaye's *Weathergoose-Woo!* (Longmans, Green), stories of the Appalachians which have the quality of genuine folklore; R. Emmet Kennedy's

Red Bean Row (Dodd, Mead), a tale which plays among the negroes of a small town across the river from New Orleans; John P. Fort's *Stone Daugherty* (Dodd, Mead), a powerful narrative of pioneer life in Tennessee, veracious in characterization, and though unsentimental, poignant in incident; William Faulkner's intensely gloomy but effective delineation of the decay of a Southern family in *The Sound and the Fury* (Cape-Smith), and Stark Young's *River House* (Scribners). Mr. Young has sketched with a sort of plaintive yearning the plantation which is no more except in recollection but which once was the seat of gracious living.

NOVELS OF SOCIAL TRANSITION

Edith Wharton.—Akin in its reflection of a past hallowed by memories to be found in *River House*—though set in the North instead of the South, Edith Wharton's *Hudson River Bracketed* (Appleton) is a tale of present-day youth threading its way to fulfilment through the encompassing associations of an earlier day.

Elizabeth Shepley Sergeant.—Likewise bridging the gap between the present and the past is Elizabeth Shepley Sergeant's *Short as Any Dream* (Harpers). This is a first novel by a writer whose skill in characterization and powers of description have been attested by her essays in contemporary portraiture and her interpretations of wartime France. Miss Sergeant has not yet completely mastered her medium, but her study of the different generations of a family seen through the eyes of a sensitive woman, and the variation of her technique in accordance with the period of her episodes, bodes well for her future achievement.

Anne Parrish.—The women novelists, one would think, are allured by the contrasts afforded by changing codes and manners for Anne Parrish, too, turns the shafts of her relentless satire on the product of an outgrown environment in *The Methodist Faun* (Harpers).

Mary Roberts Rinehart chronicles the experiences of a woman—and, indeed, of women in general—in the America that evolved from the era of bicycles to the present period of unrestricted freedom.

PERSONALITIES AND PROBLEMS IN FICTION

By way of contrast to the foregoing novels are a group that treat of personalities and problems of the immediate moment, Julian Swift's *Chronicles of a Gigolo* (Liveright) is a keen and revealing book which succeeds in winning sympathy for its hero. Fannie Hurst's *Five and Ten* (Harpers), Edmund Wilson's *I Thought of Daisy* (Scribners), a tale of Greenwich Village, Pitts Sanborn's muscial novel, "Prima Donna" (Longmans, Green), and Katherine Brush's story of the marital problems of an up-to-date young couple, *Young Man of Manhattan* (Farrar & Rinehart), may be mentioned.

NOVELS OF MANNERS AND MORALS

Among the novels of manners and morals that stand out in 1929's grist of fiction two belong to the roll of American romance rather by right of the birth of their authors than by association of those writers with the American background. Anne Douglas Sedgwick's *Dark Hester* (Houghton Mifflin) recounts with delicate understanding and comprehending sympathy the conflict of an older and a younger woman, both deeply devoted to the man who is son to one and husband to the other. Mrs. de Selincourt's novel, with its subtlety of insight and felicity of characterization, though not the best of her work, is both wise and effective. That other transplanted American, Julian Green, has produced in *The Dark Journey* (Harpers), another in the series of somber psychological studies which have won him such wide acclaim.

Delicate in its perceptions, if a bit tenuous and perhaps somewhat contrived to point its thesis, is Zona Gale's study of a neurosis in *Borgia* (Knopf). Miss Gale's heroine is an egotist whose soul battens on self-torture. Egotism, too, is the *motif* of a rather remarkable first novel in the Victorian manner by Shirley Watkins entitled *This Poor Player* (Macrae-

Smith) in which human relations become much entangled through faults of character. Emotional complications are the warp and woof likewise of such novels as Helen Grace Carlisle's *Mothers' Cry* (Harpers), a painful but impressive book; *Fugitive's Return* (Stokes), by Susan Glaspell; *Her Son* (Morrow), by Margaret Fuller, and *The Burning Fountain* (Day), by Eleanor Carroll Chilton.

CRIME AND ADVENTURE

What may perhaps best be described as the novel of robust incident finds representation in W. R. Burnett's *Little Caesar* (Dial), a story of the psychology of the gangster and incidentally of crime in Chicago; Leonard Hess's *Tomorrow's Voyage* (Washburn), a narrative of Hell's Kitchen in the days of Anthony Comstock with a defeatist philosophy; Thames Williamson's *Hunky* (Coward-McCann); Walter D. Edmond's *Rome Haul* (Little, Brown), a chronicle of Erie Canal days, and Alfred Stanford's *Invitation to Danger* (Morrow), which is a tale of the clipper ship era.

Abutting on these romances in type are tales of adventure in foreign lands such as James Gould Cozzens's *The Son of Perdition* (Morrow), which plays in Cuba, and T. S. Stribling's *Strange Moon* (Doubleday, Doran), with its story of an American engineer and his love for a Venezuelan girl. Other novels with their scenes in distant lands are Alice Tisdale Hobart's faithful portrayal of life in China entitled *Pidgin Cargo* (Century) and Eleanor Mercein Kelly's romance laid in Spain *The Book of Bette* (Harpers).

FIRST NOVELS

There is, of course, a large crop of first novels among which mention may be made of Myron Brinig's *Madonna without Child* (Doubleday, Doran) the promise of which has grown in his later *Singermann* (Farrar & Rinehart), a graphic portrayal of a Jewish family; Bayard Schindel's *Golden Pilgrimage* (Doubleday, Doran), which reflects the impression made on the mind of a sensitive child of the army circle by the war; Dorothy Glaser's *Brother Anselmo* (Payson & Clarke), a tale of chivalry; Barbara Goolden's *The Waking Bird* (Day), a story of young love, and Thomas Wolfe's *Look Homeward, Angel* (Scribner's). This last, the long odyssey of a young man in the setting of his family, has met with vigorous acclaim. It shows indubitable ability, but ability still in leash to amateurishness. Both original in theme and striking in handling is William M. John's *Seven Women* (Sears), the account of a meeting of a Ladies' Aid Society at the home of one of its members in which the obligato is played by the prairie wind out of doors and the silent battle waging in the next room where life is fighting to come into the world and fighting as it goes out of the world.

THE SHORT STORY

The short story continues to interest some of the established novelists and in such books as Louis Bromfield's *Awake and Rehearse* (Stokes), Fannie Hurst's *Procession* (Harpers), and Ring Lardner's *Round-Up* (Scribners) takes on variety and vigor. Those who would win some insight into the literary promise of the future would do well to consult *The New American Caravan* (Macaulay), a compendium wherein is to be found the short story together with other material. A book by Dreiser has always, of course, its public and his *A Gallery of Women* (Liveright), as its names indicates, a collection of stories of women, being genuinely Dreiserian, has found its readers despite its excessive length.

MISCELLANEOUS

So, too, has Robert Nathan's novel depicting the Jew in a Gentile world, *There Is Another Heaven* (Bobbs-Merrill), a fantasy which displays the true vein of its author,—delicate fancy and a subtle wit. James Branch Cabell in *Ecben* (McBride) follows along his familiar path, while John Erskine, on the other hand, in *Sincerity* (Bobbs-Merrill) makes a departure from his playground of the past to the present day. Two Indian tales are worthy of note, *Laughing Boy* (Houghton Mifflin), by Oliver La Farge, a story lauded by authorities on the Indian for its fidelity to racial psychology, and Florence E. McClinchey's *Joe Pete* (Holt), a tale of the Ojibways. Booth Tarkington has furnished a further chronicle of American boyhood in *Penrod Jashber* (Doubleday, Doran), and Percy Crosby has made his contribution to the same theme in his latest Skippy volume, *Dear Sooky* (Putnam). Finally mention should be made of what though properly a "stunt," through the excellence of its execution deserves recognition as an achievement, Lynd Ward's *Gods' Man* (Cape-Smith), a novel in woodcuts without so much as captions to carry its story.

CRITICISM AND BELLES LETTRES

By Albert Elsasser

Assistant Professor, Princeton University

Books that border on the fields of philosophy, drama, art, education, and research scholarship are omitted from the present article, as they are treated elsewhere in this volume under their respective headings. Preference has been given to books of general rather than of limited appeal. The comments, for the most part, are intended to be descriptive rather than critical.

LITERARY CRITICISM

Henry S. Canby, editor of the *Saturday Review of Literature*, collects in *American Estimates* (Harcourt) a varied group of critical essays in the field of contemporary English and American letters. G. R. Elliott, in *The Cycle of Modern Poetry* (Princeton Univ. Press) develops the theme that "poetry to-day, in England and America, is groping for a fresh direction," having outgrown the ideas and methods of the Nineteenth Century. C. B. Tinker writes gracefully of *The Good Estate of Poetry* (Little, Brown), examining critically the modern reader's approach to poetry. E. C. Chilton and Herbert Agar collaborate on a comprehensive study of the nature and uses of poetry in *The Garment of Praise* (Doubleday, Doran). In *The Reinterpretation of American Literature* (Harcourt) Professor Norman Foerster edits a symposium on certain aspects of the development of our literature. The special purpose of the volume is to suggest the kind of preliminary research that must precede a revaluation of American literature. Gorham B. Munson in *Style and Form in American Prose* (Doubleday, Doran) discusses the prose of criticism of philosophy, of fiction, and of humor, with illustrative examples. Discussions of esthetic values in writing are Henry Wells' *The Judgment of Literature* (Norton) and J. E. Downey's *Creative Imagination* (Harcourt).

BOOKS AND READING

The year has seen the appearance of an unusual number of "books about books" of the inspirational type. Worthy of notice are Robert E. Rogers, *The Fine Art of Reading* (Stratford); May Lamberton Becker, *Books as Windows* (Stokes); J. T. Winterich, *Books and the Man* (Greenberg); A. P. Sanford and R. H. Schauffler, *The Magic of Books* (Dodd, Mead); Jay B. Hubbell, *The Enjoyment of Literature* (Macmillan), and E. V. Mitchell, *Morocco Bound* (Farrar and Rinehart).

THE TEMPER OF THE TIMES

One of the most widely discussed books of the year is Walter Lippman's *A Preface to Morals* (Macmillan). It is a penetrating analysis of the moral confusion of the present day, and shows one man's working out of a philosophy to fit the times. Joseph Wood Krutch in *The Modern Temper* (Harcourt) reveals the predicament of the intellectual who finds the traditional moral and æsthetic values undermined by modern scientific thought. Norman Foerster's *American Scholar* (Univ. of N. C. Press) is an attack on modern scholarship for its failure to deal constructively with its material, and to perceive the human values in literature. Edwin Mims allies himself with the opponents of the defeatist school in *Adventurous America* (Scribner), a book of essays on important aspects of American life and thought. Waldo Frank in *The Rediscovery of America* (Scribners) analyzes the tendencies in American life. Three other titles can be brought under the present heading: *The New American Caravan* (Macaulay), the third of the series, offers a selection from the prose and poetry of the year; in *Hello Towns* (Liveright), culled from his two newspapers, Sherwood Anderson talks about the people of his adopted Virginia village; Meredith Nicholson's *Old Familiar Faces* (Bobbs-Merrill) is a series of essays giving a many-sided view of an older and passing American order.

THE LITERARY ESSAY

The familiar essay is increasingly hard to find, especially between the covers of a book. The essay has become almost grimly purposeful, and has gone in for wide circulation, *via* the magazine of the better sort. However, the old tradition of pleasant informal talk is maintained in two books of the year, both by college professors, C. H. Grandgent's *The New Word* (Harvard Univ. Press) and Odell Shepard's *The Joys of Forgetting* (Houghton). Zephine Humphrey's *Chrysalis* (Dutton), a sequel to her *Winterwise*, is a Vermont idyll. In *A Bookman's Daybook* (Liveright) Burton Rascoe comments on books and authors; the volume is a selection from his writings as literary editor of the *New York Herald-Tribune*. Two anthologies of essays are Mr. Shepard's *Contemporary Essays* (Scribner), and David McCord's *Once and For All* (Coward-McCann).

MISCELLANEOUS

C. E. Smith edits a selection of stories, sketches, and illustrations from *The Yellow Book* (E. V. Mitchell). Edmund Pearson writes the first adequate account of *Dime Novels* (Little, Brown). Vachel Lindsay: *The Litany of Washington Street* (Macmillan) is "a text-book in lyric patriotism." *The Heart of Hawthorne's Journals* (Houghton), edited by Newton Arvin, is a selection of passages from his American, English, and Italian note-books, his correspondence, and his notes for stories. Henry W. Taft writes on *Kindred Arts: Conversation and Public Speaking* (Macmillan).

ENGLISH LANGUAGE AND LITERATURE

BY ALBERT CROLL BAUGH

PROFESSOR, UNIVERSITY OF PENNSYLVANIA

GENERAL

Selective Survey.—The present survey of American research in the field covered, like its predecessors, is selective. Many studies concerned with details too technical for the layman are omitted although they are often of considerable importance to the philologist and the literary historian. A complete list of such contributions will be found in the author's bibliography in the March issue of the *Publications of the Modern Language Association* (*PMLA*).[1] The reader should also consult J. P. Willard's *Progress of Medieval Studies in the United States*, Bulletin No. 7 (Boulder, 1929), Hardin Craig's "Recent Literature of the English Renaissance" (*SP*), and R. S. Crane's "English Literature, 1660-1800: A Current

---

[1] Periodicals are cited under the following abbreviations, the reference being always to the volume for the year covered by this review: *PMLA, Publications of the Modern Language Association of America; MP, Modern Philology; MLN, Modern Language Notes; MLR, Modern Language Review; JEGP, Journal of English and Germanic Philology; SP, Studies in Philology; PQ, Philological Quarterly; RES, Review of English Studies; RR, Romanic Review.* Titles appearing as theses or in the publications of universities are followed where possible by the name of the university.

Bibliography" (*PQ*), the last two of which include foreign as well as American work.

The Approach to Literature.—The appreciation of literature is a subject of constantly increasing importance in an age when reading for many people is not a habit formed in childhood but a taste cultivated after maturity in the conscious desire for self-improvement. Hoxie N. Fairchild's *An Approach to Literature* and Jay B. Hubbell's *The Enjoyment of Literature* are useful introductions to the subject. Walter B. Pitkin's *The Art of Rapid Reading* suggests some interesting tests and expedients. John T. Winterich's *Books and the Man* is a volume of essays on well-known books from the point of view of the collector.

Literary Discussion.—*Essays in Criticism* by members of the Department of English at the University of California contains discussions of poetry and morals, humor, and biography, and essays touching on Chaucer, Shakespeare, Goldsmith, Thackeray, and others. Somewhat simliar in scope is a collection of papers published under the title *The Fred Newton Scott Anniversary Papers* and presented to Professor Scott as an anniversary gift from his colleagues and former students. C. H. Grabo has published a book on *The Technique of the Novel.* G. L. Kittredge's *Witchcraft in Old and New England* is a comprehensive treatment of a topic that touches literature at many points.

The Drama.—Students of the drama will find two books this year of general interest,—T. H. V. Motter's *The School Drama in England,* tracing the dramatic activities of Winchester, Eton, Rugby, Harrow, and the other great public schools, and A. H. Thorndike's *English Comedy,* surveying the field from the Middle Ages to the present.

THE ENGLISH LANGUAGE

Among interesting studies of special points in Old English are Louise G. Frary's dissertation, *Studies in the Syntax of the Old English Passive* (Minnesota); and Samuel Kroesch's "The Semantic Development of OE *cræft*" (*MP*). G. P. Krapp and A. G. Kennedy have published *An Anglo-Saxon Reader* with a grammatical introduction on somewhat simplified lines. Clara Kuck's "Correction of Speech Defects: A Bibliography" (*Amer. Speech*) is a useful compilation. William F. Luebke in "The Analytic Future in Contemporary American Fiction" (*MP*) discusses modern usage of *shall* and *will;* G. O. Curme considers "The Forms and Functions of the Subjunctive in the Classical and Modern Languages" (*MP*); and Janet A. Aiken proposes an explanation of *Why English Sounds Change.*

OLD ENGLISH LITERATURE
(450-1150)

The year has seen the publication of an important group of studies mostly in the field of Old English presented as an anniversary volume to the distinguished editor of *Beowulf,* Frederick Klaeber. The volume bears the title *Studies in English Philology: A Miscellany in Honor of Frederick Klaeber.* The contributions are too numerous to specify, but the list of contributors contains the names of many well-known American and European scholars. Mention may be made also of Kemp Malone's "The Identity of the Geatas" (*Amer. Jour. of Philology*) and Henning Larsen's "Kemble's Salomon and Saturn" (*PQ*).

MIDDLE ENGLISH LITERATURE
(1150-1500)

Bibliographical Discussion.—Hope E. Allen, "On the Author of the *Ancren Riwle*" (*PMLA*), believes the author was Godwin, hermit of Kilburn, but abandons her former identification of him with the precentor of Salisbury, and suggests the interesting hypothesis that he was also the author of the first five Lamberth homilies. Henry B. Hinckley, "The Date, Author, and Sources of the Owl and the Nightingale" (*PMLA*), dates the poem 1178 or 1179 and suggests as the author a Magister Nicholaus who witnessed a charter granted by the Bishop of Winchester between 1141 and 1171.

History.—Acton Griscom has edited *The Historia Regum Britanniæ* of Geoffrey of Monmouth with an extensive introduction and a translation of a version in Welsh.

Romance.—Foster E. Guyer's "The Chronology of the Earliest French Romances" (*MP*) reëxamines the grounds for dating the romances of Alexander, Troy, Thebes, and Eneas; and R. S. Loomis continues his Arthurian studies in "Bron and Other Figures in the *Estoire del Saint Graal*" (*MLR*). F. P. Magoun, Jr., has edited two texts of Alexander romances under the title *The Gestes of Alexander of Macdeon.* The introduction contains a masterly survey of the development of the legend. Margaret Schlauch offers an interesting contribution on "The Historical Background of *Fergus and Galiene*" (*PMLA*), a romance in French but written in England, and A. C. Baugh calls attention to "A Source for the Middle English Romance, Athelston" (*PMLA*), incidentally affording further evidence of the poet's unusual skill in weaving a plot.

Poetry.—Henry W. Wells, "The Construction of Piers Plowman" (*PMLA*), finds symmetry and artistic consciousness in the poem to a degree not generally appreciated and points out several interesting parallelisms in the structure of the two parts. C. E. Ward, "The Authorship of The Cuckoo and the Nightingale" (*MLN*), considers that of the three Clanvowe's who are eligible, Sir Thomas has the best claim. Carleton Brown, in "Somer Soneday" (*Klaeber Miscellany*), reëdits the text of this interesting poem and offers good reason for assigning it to an earlier date. Louise Pound in "A Recent Theory of Ballad-Making" (*PMLA*) breaks a lance with Professor Gerould.

Drama.—In the field of the drama the question of the relation of the York and Towneley cycles has again come to the fore. Grace Frank, "On the Relation between the York and Towneley Plays" (*PMLA*), argues for borrowing by Towneley from York while Marie C. Lyle, "The Original Identity of the York and Towneley Cycles—A Rejoinder" (*PMLA*), defends her theory of a common original.

Science.—Mention should be made finally of Lynn Thorndike's *Science and Thought in the Fifteenth Century,* a collection of studies in the history of medicine, natural science, philosophy, and politics.

Chaucer.—The year has been less productive in Chaucerian studies than we have come to expect from American scholarship. The outstanding contribution of 1929 is Edgar F. Shannon's *Chaucer and the Roman Poets,* the fruit of years of preoccupation with this special topic. The major portion (Part I) deals with Chaucer's indebtedness to Ovid and Virgil; Part II treats his relation to the other Roman poets. M. B. Ruud's "Chaucer Studies, 1928" (*PQ*) is a useful survey. J. S. Graydon offers a lawyer's "Defense of Criseyde" (*PMLA*), to which J. M. Beatty replies (*SP*). Florence E. White gathers documents throwing light on "Chaucer's Shipman" (*MP*). J. R. Hulbert in "What Was Chaucer's Aim in the Knight's Tale?" (*SP*) thinks the poet used the story as a vehicle in which to present a problem of courtly love; Agnes K. Getty discusses "Chaucer's Changing Conceptions of the Humble Lover" (*PMLA*); and C. O. Chapman gathers together the passages that illustrate the views of "Chaucer on Preachers and Preaching" (*PMLA*).

MODERN ENGLISH LITERATURE (1500-1700)

Journalism.—Matthias A. Shaaber's *Some Forerunners of the Newspaper in England, 1476-1622* (Pennsylvania), is a valuable study in the beginnings of modern journalism.

Lord Surrey.—F. M. Padelford, in "A Sixteenth Century Courtier: Henry Howard, Earl of Surrey" (*Johns Hopkins Alumni Mag.*), presents in popular form the ripe scholarship of many years devoted to the study of this important poet.

Spenser.—During the year Edmund Spenser has received much attention. M. Y. Hughes's *Virgil and Spenser* (California) is an exhaustive attempt to isolate and appraise Spenser's direct indebtedness to the Roman poet. The same author has also discussed

"Virgilian Allegory and The Faerie Queene" (*PMLA*). Of somewhat similar interest in C. W. Lemmi's "The Symbolism of the Classical Episodes in The Faerie Queene" (*PQ*). E. M. Albright examines "Spenser's Cosmic Philosophy and His Religion" (*PMLA*) and defends her views "On the Dating of Spenser's 'Mutability' Cantos" (*SP*). Rosemond Trve draws parallels between "The Red Cross Knight and Mediaeval Demon Stories" (*PMLA*), and Edwin Greenlaw presents sources and analogues for the episode of "Britomart at the House of Busirane" (*SP*). John E. Hankins has supported with cogent argument the identification of "The Harpalus of Spenser's Colin Cloud" (*MLN*) with the poet George Turberville.

Elizabethan Drama.—Edwin Nungezer has compiled a useful *Dictionary of Actors and of Other Persons Associated with the Public Representation of Plays in England before 1642* (Cornell) and G. E. Bentley has gathered many new "Records of Players in the Parish of St. Giles, Cripplegate" (*PMLA*) and found several "New Actors of the Elizabethan Period" (*MLN*) in the records of other parishes. John R. Moore's "The Songs of the Public Theaters in the Time of Shakespeare" (*JEGP*) and E. S. Lindsey's two articles, "The Music in Ben Jonson's Plays" (*MLN*) and "The Original Music for Beaumont's Play The Knight of the Burning Pestle (*SP*), treat similar topics. E. C. Knowlton discusses "The Plots of Ben Jonson" (*MLN*). Samuel A. Tannenbaum continues his studies in Elizabethan paleography with "A Hitherto Unpublished John Fletcher Autograph" (*JEGP*) and "Dr. Greg and the 'Goodal' Notation in Sir Thomas Moore" (*PMLA*), to which Dr. Greg briefly replies. A number of studies connected with individual plays can be only briefly enumerated: W. K. Chandler on Dekker's "The Shoemakers' Holiday" (*MP* and *SP*), N. D. Solve on Chapman's *Tragedy of Chabot* (Michigan), J. W. Ashton on "John a Kent and John a Cumber" (*PQ*), and G. E. Dawson on Kirke's *The Seven Champions of Christendom* (Western Reserve).

Shakespeare.—Among the more important studies devoted to Shakespeare mention may be made of R. W. Babcock's "A Preliminary Bibliography of Eighteenth Century Criticism of Shakespeare" and "A Secondary Bibliography of Shakespeare Criticism in the Eighteenth Century" (*SP*). Madeleine Doran has studied *The Relation of the Contention and the True Tragedy to Henry VI, Parts 2 and 3* (Iowa). J. S. G. Bolton in "The Authentic Text of Titus Andronicus (*PMLA*) argues for greater trust in the readings of the first and second quartos. Beatrice D. Brown suggests "Mediæval Prototypes of Lorenzo and Jessica" (*MLN*) and John D. Rea proposes an interesting connection between "Shylock and the Processus Belial" (*PQ*). R. M. Smith traces "The Formation of Shakespeare Libraries in America" (*Shakes. Assoc. Bull.*). Alvin Thaler's *Shakspere's Silences* gathers together some of the author's studies on Shakespeare, Milton, and other poets.

Milton.—E. C. Baldwin has discussed "Some Extra-Biblical Semitic Influences upon Milton's Story of the Fall of Man" (*JEGP*) and E. H. Riley has written on "Milton's Tribute to Virgil" (*SP*). Kathleen E. Hartwell has examined the relation of Lactantius and Milton. Maximilian Rudwin is the author of an interesting series of articles of interest to Milton students, including "The Legend of Lucifer," "The Number and Names of the Devils," "The Form of the Fiend," "The Organization of Pandemonium," "Journeys to Hell," and "Diabolus Simia Dei," all in *The Open Court.*

Seventeenth Century Drama.—B. V. Crawford discusses "High Comedy in Terms of Restoration Practice" (*PQ*). John H. Wilson studies *The Influence of Beaumont and Fletcher on Restoration Drama* (Ohio State). A. S. Borgman's *Thomas Shadwell: His Life and Comedies* is an important study of a poet whom Dryden blasted with a famous line. It can be supplemented by Claude Lloyd's "Shadwell and the Virtuosi" (*PMLA*). Miss Kathleen M. Lynch discusses the "Conventions of Platonic Drama in the Heroic Plays of Orrery and Dryden" (*PMLA*). Marjorie Nicholson's "New Material on Jeremy Taylor" (*PQ*) and "The Early Stage of Cartesianism in England" (*SP*) are valuable contributions to her chosen field.

Bunyan.—It is a pleasure to record James B. Wharey's beautiful and definitive edition of Bunyan's *The Pilgrim's Progress from this World to That Which Is to Come.*

THE EIGHTEENTH CENTURY

R. D. Havens has made an interesting contribution to the question of "Changing Taste in the Eighteenth Century" (*PMLA*), based on a comparative study of Dryden's and Dodsley's *Miscellanies.* John W. Draper has supplemented his work on the funeral elegy by a volume called *The Funeral Elegy and the Rise of English Romanticism.* Austin Warren is the author of a monograph on *Alexander Pope as Critic and Humanist* (Princeton). Karl J. Holzknecht considers "Horace Walpole as Dramatist" (*South Atlantic Qu.*) and Miss Gertrude V. Ingalls finds "Some Sources of Goldsmith's *She Stoops to Conquer*" (*PMLA*) in the pages of *The Spectator.* Frederick A. Pottle's *The Literary Career of James Boswell, Esq.: Being the Bibliographical Materials for a Life of Boswell* is of primary importance. L. M. Ellison traces the relation of "Elizabethan Drama and the Works of Smollett" (*PMLA*) and Joseph B. Heidler has published a dissertation on *The History, from 1700 to 1800, of English Criticism of Prose Fiction* (Illinois). F. B. Snyder continues his corrective criticism of the biography of Burns in "Burns's Last Years" (*SP*) and J. D. Ferguson in "Burns and the Indies in 1788" (*MLN*) shows that the notion that Burns contemplated going to the Indies is the result of a misreading in one of his letters.

THE NINETEENTH CENTURY

Poets and Novelists.—Contributions to the study of nineteenth century literature are so numerous that only a selection of the titles can be mentioned. T. M. Raysor in "Coleridge and 'Asra'" (*SP*) traces the poet's love for Sarah Hutchinson. G. L. Marsh in "The Early Reviews of Shelley" (*MP*) gives a valuable conspectus of contemporary opinion of Shelley. G. R. Elliott's *The Cycle of Modern Poetry* is a series of essays on Shelley, Byron, Keats, Arnold, Browning, and others. B. H. Lehman examines *Carlyle's Theory of the Hero: Its Sources, Development, History, and Influences on Carlyle's Work.* Wanda F. Neff is the author of a volume on the *Victorian Working Woman: An Historical and Literary Study of Women in British Industries and Professions 1832-1850.* W. T. Hale's *Anne Brontë: Her Life and Writings* (Indiana), Edward Wagenknecht's *The Man Charles Dickens: A Victorian Portrait,* and R. S. Forsythe's *A Noble Rake, the Life of Charles, Fourth Lord Mohun, Being a Study in the Historical Background of Thackeray's Henry Esmond* treat various aspects of the novel. Mention may also be made of H. H. Hatcher's *The Versification of Robert Browning* (Ohio State) and Samuel C. Chew's *Swinburne,* a biographical and critical study of the poet.

Contemporary.—Among contemporary writers Bernard Shaw is dealt with in Edward Wagenknecht's *A Guide to Bernard Shaw* and Archibald Henderson's *Is Bernard Shaw a Dramatist?* Lionel Stevenson in "A Source for Barrie's Peter Pan" (*PQ*) finds suggestive parallels in George MacDonald's *Lilith.* Students of the contemporary novel will read with great interest Wilbur Cross's "Arnold Bennett of the Five Towns" (*Yale Rev.*).

GERMAN LANGUAGE AND LITERATURE

By Friedrich Bruns

Professor, University of Wisconsin

THE OLDER PERIOD

Hans Naumann gives a succinct account of the cultural and spiritual background of the literature of the Middle High German period: *Höfische Kultur.* (Buchreihe der Deutschen Vierteljahrsschrift, vol. 17, Halle, Niemeyer.) In the second-half of the volume Günther Müller discusses the "Höfische Kultur der Barockzeit." Andreas Heusler's "Nibelungensage und Nibelungenlied" comes out in a third revised edition (Dortmund, Ruhfuss). Georg Ellinger continues his investigations in the neo-Latin literature of Germany in the 16th century: part two of his *Geschichte der neulateinischen Literatur Deutschlands im 16. Jhdt.* is out (Berlin, de Gruyter). Werner Burkhard gives us a study of the religious spirit of the work of Grimmelshausen: *Grimmelshausen. Erlösung und barocker Geist.* (Frankfurt, Diesterweg.)

THE MODERN PERIOD

General Works.—Rudolf Unger has published his *Gesammelte Studien* in two volumes,—I. *Aufsätze zur Prinzipienlehre der Literaturgeschichte;* II. *Aufsätze zur Literatur- und Geistesgeschichte.* (Berlin, Junker & Dünnhaupt.) These two volumes introduce a new series of monographs, "Neue Forschung." Hettner's standard work, *Geschichte der deutschen Literatur im 18. Jhdt.*, has been edited by G. Witkowski. (Leipzig, List.) Hugo Bieber has written a history of German literature from 1830 to 1880: *Der Kampf um die Tradition.* (Stuttgart, Metzler.) E. Castle's *Deutsch-Österreichische Literaturgeschichte* has been completed with its third volume. "1848-1918" (Wien, Fromme). The dramatic theory and technique of the young *Stürmer und Dränger* is the subject of a study by Siegfried Melchinger: *Dramaturgie des Sturmes und Dranges* (Gotha, L. Klotz). The rôle that Shakespeare's contemporaries have played in Germany is portrayed by Fritz Wölcken: *Shakespeare's Zeitgenossen in der deutschen Literatur.* (Neue Forschung.) Max Kommerell, a disciple of Stefan George and Gundolf, writes on *Der Dichter als Führer in der deutschen Klassik. Klopstock, Herder, Goethe Schiller, Hölderlin.* (Berlin, G. Bondi 1928.) Herder as a literary critic is analyzed by Werner Kohlschmidt in his *Herder-Studien* (Neue Forschungen). *Wahn und Wirklichkeit im Drama der Goethezeit* is the title of a monograph by E. Kästner (Leipzig, J. J. Weber).

Goethe.—Bielschowsky's standard work has been revised by Walter Linden (2. vol. München, C. H. Beck) Paul Fischer has brought out *Goethe Wortschatz* (Leipzig, Rohmkopf) somewhat pedantic, but useful. F. A Hohenstein, who has written on Schiller's tragic theory, has a book on Goethe with the striking title: *Goethe Die Pyramide* (Dresden, W. Jers) *Goethes Bild der Landschaft* is the subject of a large monograph by Richard Beitl (Berlin, de Gruyter). The centenary of Goethe's Faust on the German stage was the occasion of a monograph by Julius Petersen *Goethe's Faust auf der deutschen Bühne.* (Leipzig, Quelle u. Meyer.) Curt Glaser has written a biography Goethe's father: *Goethe's Vater* (Leipzig, Quelle u. Meyer).

Schiller.—A brief but useful interpretation of Schiller is the little book by H. H. Borcherdt: *Schiller. Seine geistige und künstlerische Entwicklung* (Leipzig, Quelle u. Meyer).

Romanticism.—The interest in Romanticism continues unabated, as the following list shows: Josef Körner *Die Botschaft der deutschen Romantik an Europa* (Augsburg, Filser) Hans Dahmen: *E. T. A. Hoffmann Weltanschauung* (Marburg, Elwert) Lothar Kempten: *Hölderlin und di Mythologie* (Horgen, Münster-Presse) Gerhard Fricke: *Gefühl und Schicksa bei H. v. Kleist* (Neue Forschung)

An American Ph.D. dissertation by J. A. Hess collects Heine's statements about the Germans: *Heine's Views on German Traits of Character* (Leipzig, Stechert). The most important contribution in the field of German Romanticism because of new material made available is the critical edition of *Novalis* in four volumes by P. Kluckhohn and R. Samuel (Leipsig, Bibl. Inst.). I conclude with Norbert Langer's monograph: *Das Problem der Romantik bei Nietzsche* (Münster, Helios-Verlag).

Hebbel.—The publication of Elise Lensing's letters to Friedrich Hebbel gives us new insight into Hebbel's life: *Briefe an Friedrich Hebbel* (Berlin, Behr). Three new monographs on Hebbel are worth noting: L. Blaustein, *Das Gotteserlebnis in Hebbels Dramen* (Berlin, Reuther u. Reichardt); A. M. Nagler, *Hebbel und die Musik* (Köln, J. P. Bachem), and Hugo Werner, *Hebbels Aenderungen an den Gedichten* (Berlin, Behr).

Annette von Droste-Hülshoff.—Her religious attitude is the subject of a book by Ed. Hollweg with the lengthy title: *Von der getrosten Verzweiflung. Welt, Mensch und Gott in den Dichtungen der Annette v. D. H.* (Hamburg, Ernte-Verlag). A third enlarged edition of the correspondence of Annette and of her young friend Leone Schüking has been edited by R. C. Müschler: *A. v. D.H. und L.S.: Briefe* (Leipzig, Grunow).

Miscellaneous.—Hedwig Wäber has edited the family letters of J. Gotthelf, *Familienbriefe* (Frauenfeld, Huber & Cie.). The mission of W. Raabe is interpreted by Wilhelm Fehse: *W. Raabes Sendung* (Berlin, Klemm). Two new popular editions of C. F. Meyer will be of interest: *Reclam and Bong.* A brief but excellent discussion of present-day German literature has just been published in Reclam's famous *Universalbibliothek:* "Deutsche Dichtung der Gegenwart," by Paul Fechter. Erwin Langner's *Die Religion G. Hauptmanns* (Tübingen, Mhor) takes up an alluring problem. The narrative art of Thomas Mann is discussed by H. A. Peter: *Thomas Mann und seine epische Charakterisierungskunst* (Bern, P. Haupt).

ROMANCE LANGUAGES AND LITERATURE

By Clyde Cannon Webster

Instructor, Harvard University

LINGUISTIC

H. F. Muller, in *A Chronology of Vulgar Latin* (Zeit. Rom. Phil.), argues for a VL. common to the whole Empire until the Eighth Century when dialects developed through changed social conditions. The *Mélanges Jeanroy* (Droz) include interesting contributions by Americans, notably a discussion by C. H. Grandgent on the origin of doublets due to differences in social strata, and etymologies by Armstrong, Blondheim, Holmes, and Jenkins. Elsewhere are found etymologies too numerous to mention here. Contributions to Spanish include C. C. Rice's *Spanish Etymologies* (Language, V.) and L. O. Wright's *The Indicative Function of the -ra Verb Form* (Hispania, XII.)

FRENCH LITERATURE

Medieval.—In the medieval period four important editions have been published, two in the Eliott Monographs Series (Princeton); *Gui de Cambrai, Le Vengement Alixandre,* edited by B. Edwards, and *Gérard de Nevers—Prose Version of the Roman de la Violette* by F. H. Lowe, and two in the Publications of the Institute of French Studies (Columbia): *The Lays of Desiré, Graelent, and Melion* by M. Grimes and *La vie de Saint Thibaut* by H. E. Manning. W. P. Shepard, in *A New Manuscript of the Récits d'un ménestrel de Reims* (Pub. Mod. Lang. As., XLIII) publishes a list of variants based on De Wailly's edition. To the *Mélanges Jeanroy* C. H. Livingston contributes two tales by Vigneulles, W. P. Shepard a *débat,* C. L. Hamilton a discussion of a medieval plagiarism, and R. T. Holbrook some notes on *Pathelin.*

Renaissance.—In the renaissance period U. T. Holmes and M. L. Radoff collaborate in an article on "Claude Fauchet and his Library" (*PLMA,* XLIV), while J. L. Gerig publishes an interesting study of *Ant. Arlier and the Renaissance at Nîmes* (Inst. Fr. S.).

Seventeenth Century. — The outstanding work on the seventeenth century is a *History of French Dramatic Literature in the Seventeenth Century, Part I* (Johns Hopkins Press) by H. C. Lancaster, who also contributes an article on the introduction of the unities into French drama (*Mod. Lang. Notes,* XLIV). B. Matulka publishes an edition of Scudéry's *Le Prince déguisé* (Inst. Fr. S.), and H. A. Grubbs an article of great interest on "The Originality of La Rochefoucauld's Maxims" (*Rev. H. Litt.,* XXXVI).

Voltaire. — Students of Voltaire furnish several studies of interest. I. O. Wade offers an explanation of "Voltaire's Name" (*PMLA,* XLIV). G. L. van Roosbroeck publishes *Alzirette* and *L'Empirique,* parodies, respectively, of *Alzire* and *Mahomet* (Inst. Fr. S.), also some "Additions and Corrections to Voltaire's Bibliography" (*MLN,* XLIV). N. L. Torrey, from a manuscript in the Voltaire collection at Leningrad, fixes the date of *Candide* and discusses some of Voltaire's corrections (*ibid.*). With the collaboration of G. R. Havens, he describes "The Private Library of Voltaire at Leningrad" (*PMLA,* XLIII) and gives a selected list of "Voltaire's Books" (*Mod. Phil.,* XXVII) in that collection.

Rousseau continues to interest scholars. A. Schinz analyses *La pensée de J.-J. Rousseau* (Alcan); E. H. Wright essays to penetrate *The Meaning of Rousseau* (Oxford P.), while J. Trenon, in "The Paradox of Rousseau" (*PMLA,* XLIII), takes issue with the opinions of G. R. Havens. Some overlooked Manuscripts of J.-J. Rousseau at Harvard University (*Rom.* Rev., XX) are published by R. L. Hawkins, who also unearths the original English version of an autobiographica sketch by Bernardian de Saint Pierr (*ibid.*). Other studies are I. O. Wade' *The Title of Sedaine's Le Philosoph sans le savior* (*ibid.*) and G. Chinard's *Lettres inédites de Beaumarchais . . .* (Johns H. P.)

Nineteenth Century.—Studies include La fin de la Muse Française (*RHL,* XXXVI), by S. I. Stone, "A unedited Letter of Béranger" (*RR* XX) by H. Kurz, and two Balzac in edita published by D. O. Evan (*MLN,* XLIV) and T. R. Palfre (*ibid.*). W. H. Royce's *Balzac:* Bibliography (U. Chicago P.) is work of extreme importance to students of the novel, who will also rea with interest two vivid biographies H. S. Gorman's *The Incredible Marquis, Alexandre Dumas* (Farrar Rinehart) and M. Josephson's *Zol and his Time* (Macaulay). To th study of poetry, S. A. Rhodes contributes *The Cult of Beauty i Charles Baudelaire* (Inst. Fr. S.) an H. Peyre *A Study of Obscurity in Recent French Poetry* (*RR,* XX). Th latter also discusses Renan as literary critic (*PMLA,* XLIV).

Louisiana. — R. Caulfield has study on *The French Literature o Louisiana* (Inst. Fr. S.) which wi interest both students of French literature and of American history.

Provençal.—An important book o the *mouvement félibréen* is *L'Écol auvergnate* (Champion), in which E H. Titchener makes a literary an linguistic study of Vermenouze an his group.

SPANISH

In the medieval period fou studies are of interest: H. Peirce *Aspectos de la personalidad del re español . . .* (Smith Col.), E. C Hills's *The Unity of the Poem of th Cid* (Hisp., XII), S. E. Leavitt *Divine Justice in the Hazañas del Ci* (ibid.), and *Cuatro poemas de Berce* (Madrid) by C. C. Marden. Thre rare *autos* of Montemayor are r printed by F. Whyte (*PMLA,* XLIII J. D. M. Ford discusses "Plot, Tal and Episode in Don Quixote" (*M langes Jeanroy*), and H. C. Heato argues plausibly that "La selva confusa," attributed to Calderon, is by Lope (*PMLA*, XLIV). The latter's *El Brasil restituido* is edited by G. de Solenni with a study of patriotism in his plays (Columbia P.). J. P. W. Crawford studies Italian influences on Góngora's apprentice years (*RR*, XX). In the *Revue Hispanique* (LXXV) Heaton analyses an anonymous "Pieza de títulos de comedias," while J. M. Hill republishes the rare catalogue of dramas of Medèl del Castillo. J. Warshaw writes on "Galdós's Apprenticeship in the Drama" (*MLN*, XLIV) and *Errors in Biographies of Galdós* (Hisp., XI).

ITALIAN

Dante notes are contributed by H. D. Austin (*MLA*, XLIV), A. E. Trombly (*ibid.*), and O. M. Johnston (*RR*, XX). H. F. Dunbar studies *Symbolism in Medieval Thought and its Consummation in the Divine Comedy* (Yale). *Dante: Poet and Apostle* (U. Chicago P.) is the theme of a pleasing book by E. H. Wilkins who also contributes to the same series two studies on Petrarch: *Modern Discussions of the Dates of Petrarch's Prose Letters* and *A Tentative Chronological List of Petrarch's Prose Letters*. C. P. Merlino presents *The French Studies of Mario Equicola* (U. Cal. P.), while R. Altrocchi studies *Tasso's Holograph Annotations to Horace's Ars Poetica* (*PMLA*, XLIII). In the contemporary field H. L. Cleasby discusses *Italo Svevo* (Italica, VI), a writer of introspective fiction.

ROUMANIAN

The Institute of Roumanian Culture publishes a book of interest to Romance scholars, *The Development of Roumanian Poetry* by L. Feraru.

LATIN LITERATURE

By John C. Rolfe

Professor, University of Pennsylvania

The Classical Investigation.—Although the *Report* of this investigation was not published until 1924, it has already had an important effect on the teaching of Latin, and many text-books have been made which purport to be based upon its recommendations. But already there are signs of discontent with the results of the subordination of grammatical study, and of the notion that the main "objective" of the study of Latin is to improve the students' use of English. This discontent is set forth in plain terms in a criticism of the *Report* by A. Walker (*C. J.* xxv, 83 ff.*). He accuses the Investigation of having upset the methods and standards that we had, without replacing them with anything definite, and with having proposed four methods which have been tried and found wanting. He concludes that our average standard is lower than before the *Report* appeared. With all this the writer agrees cordially, except as to one of the four methods. He rejoices with Hendrickson (*C.J.* xxiv, 168) that Hale's *Art of Reading Latin* has been reprinted, and he agrees with Mignonette Spilman (*C.J.* xxiv, 323 ff.) that reading in the Latin order is a "practical objective," possible of attainment in the first two years of Latin study—not however, he would add, without sound grammatical training, or in the hands of poorly equipped teachers. A similar indictment is made by C. Knapp (*C.J.* xxiv, 643 ff.), who correctly attributes good teaching to personality and knowledge, rather than to method. M. Ogle (*C.W.* xxii, 141 ff.), does not regard the *Report* as an inspired word, and finds that the study which he is reviewing shows, "not a pressing need to make the teaching of Latin function in the teaching of English, but a pressing need to study Latin in order to understand Latin." Finally F. Potter, in a very impartial review of two of the best books founded on the recommendations of the *Report*, after justly praising their many excellent features, concludes with the significant statement, that the student will have much to learn of the *language* before he can successfully attempt any of the writings of the Romans themselves.

---

* Periodicals are abbreviated as follows: *A.J.P., American Journal of Philology; C.J., Classical Journal; C.P., Classical Philology; C.W., Classical Weekly; P.Q., Philological Quarterly; T.A.P.A., Transactions of the American Philological Association; C.U., University of California Publications in Classical Philology.*

Grammar and Linguistics. — In spite of the cold water thrown on the study of grammar by the Classical Investigation, papers in that general field continue to appear, partly owing to the influence of the Linguistic Institute of America and the facilities which it offers for the prompt issue of such publications. R. G. Kent in "The Conquests of the Latin Language" (*C.J.* xxiv, 191 ff.) shows that Latin in its proper form, in its modern form, and in Latinized languages like English, is still the speech of hundreds of millions of people, scattered over the surface of the world. Under the auspices of the Institute E. Yoder discusses "The position of Possessive and Demonstrative Adjectives in the *Attic Nights* of Aulus Gellius" and M. Odgers studies "The Meaning and Use of Latin *parens*," both being doctoral dissertations of the University of Pennsylvania. E. Nichols (*A.J.P.*, L, 40 ff.) treats "The Semantics of the Termination *-ario-*." R. Steele (*P.Q.* viii, 43ff.) writes of "Elision in the Latin Dactylic Hexameter," and E. McCartney (pp. 7, 9 ff.) compares "Zeugma in Vergil's *Aeneid* in Latin and in English." R. Flickinger examines "Indefinite *quis* in Horace" (*C.J.* xxv, 119 ff.), Sister Wilfrid (*C.W.* xxii, 73 ff.) discusses the question, "Is there an *Africitas?*" and H. Rebert (*C.P.* xxiv. 169 ff.) traces "The Origin and Meaning of Latin *at*."

Mediaeval Latin.—From B. Ullman we have the first edition of Sicco Polenton's eighteen books on *The Distinguished Writers of the Latin Language* (vol. vi of the Papers and Monographs of the American Academy in Rome). A. P. Wagener (*C.W.* xxii, 155 ff.) writes of "Melancthon, a German Humanist." Cornelia Coulter examines "The 'Terentian' Comedies of a Tenth Century Nun" (Hrotsvitha), and concludes that her contribution to mediæval Latin is far greater than her connection with Terence. H. Martin (*C.P.* xxiv, 245 ff.) offers "A contribution to the Lexicography of Certain Merovingian Charters." W. Mustard gives us an edition of the *De Curialium Miseriis Epistola* of Aeneas Silvius (Johns Hopkins Press). The Publications of the Catholic University of America add to the contributions in grammar a study of "The Vocabulary of the Moral-Ascetical Works of St. Ambrose"; and Sister Mary Buck edits St. Ambrose *De Helia et Ieiunio.*

Latin and English.—*Chaucer and the Roman Poets*, by E. Shannon, forms vol. vii of the Harvard Studies in Comparative Literature. T. S. Dunn (*C.J.* xxiv, 285 ff.) discusses "The Classical Names in Historical Fiction," showing the absurd errors made by writers who are ignorant of the principles of Roman nomenclature. In a similar vein is "Having Fun with Latin" by W. Ellis (*C.J.* xxiv, 421 ff.), which has no reference to the Classical Investigation, as one might suspect, but contains the gleanings of a proof-reader with a sense of humor. A University of Missouri dissertation treats "Catullian Influence in English Lyric Poetry, *circa* 1600-1650." H. C. Lipscomb writes of "Horace and the Poetry of Austin Dobson" (*A.J.P.* L, 1 ff.); Ada Coe, of "Spenser and Ovid" (*C.W.* xxii, 91 ff.), an article which elicits notes from various hands (pp. 166, 184 and 208); C. Knapp, of "The Classical Element in Smollett, Roderick Random" (*C.W.* xxiii. 9 ff. and 17 ff.). Here, too, belong some of the papers cited above under the head of "Grammar and Linguistics," and it seems the appropriate place to draw attention to G. Showerman's timely plea for better punctuation. As he rightly says (*C.J.* xxiv, 58), "if punctuation is enough of an art to have its freedoms, it is enough of a science to have its rules." This applies both to Latin and to English, but especially to the latter.

Relation to Modern Civilization.—This is discussed by Ruth Thomas in "The Unchanged" (*C.J.* xxiv, 659 ff.) and by A. Rini in "Superstition in Petronius and Italian Superstitions of To-day" (*C.W.* xxii, 83 ff.). Various brief notes (*C.W.* xxii) speak of "The Mention of Death and Knives and Forks" (p. 120), along with such very up-to-date topics as "The Price of Real Estate, Ancient and Modern" (xxiii, p. 8), "The New Music and Dionysius of Halicarnassus," (p. 112), "Pliny the Elder on Reducing and Halitosis" (p. 166), and many others.

Palaeography and Epigraphy.—E. Sage (*A.J.P.* L, 21 ff.) discusses "The Text Tradition of Petronius," and B. Ullman (*C.P.* xxiv, 109 ff.) that of the "Laus Pisonis." J. Savage studies the "Scholia on Vergil's *Eclogues* in Harleianus 2782" (*C.P.* xxiv, 274 ff.). L. W. Jones examines "The Cults of Dacia" (*U.C.* 9, 8), Lillian Lawler, "Married Life in CILIX" (*C.J.* xxiv, 346 ff.); H. J. Leon, "Names of Jews in Ancient Rome" (*T.A.P.A.* lix, 205 ff.).

The Roman Writers.—The number of works under this head is great and varied; only a few can be mentioned. W. Green (*C.P.* xxiv, 183 ff.) writes of "Greek and Roman Law in the *Trinummus* of Plautus," L. R. Shero (*A.J.P.* L, 64 ff.) of "Lucilius' *Cena Rustica.*" Gertrude Hirst investigates "Some Passages in the Prologue to Vergil's *Georgics*" (*T.A.P.A.* lix, 19 ff.), and H. Rebert, "The Infelicity of *infelix* in Vergil's *Aeneid*" (id. 57 ff.). G. Hendrickson (*C.P.* xxiii, 332 ff.) analyzes "The Third Satire of Persius," and B. Berry (*C.P.* xxiv, 231 ff.) discusses "The story of Thelyphron in Apuleius." M. Deutsch continues his studies in the life of Julius Caesar with "Caesar's Son and Heir" (*U.C.* 9, 6), "Caesar and Mucia" (*P.Q.* viii, 218 ff.), and "I am Caesar, not Rex" (*C.P.* xxiii, 394 ff.). R. Ohl, as his doctoral dissertation at Pennsylvania, gives us a welcome and needed edition of the *Enigmas* of Symposius.

Miscellaneous.—Under this caption the wide range of interest of present day scholars is apparent; a few specimans must suffice. One of the most interesting books of the year is D. R. Stuart's *Epochs of Greek and Roman Biography* (Sather Lectures, Berkeley, Calif.), a valuable contribution to an important subject. E. McCartney (*C.W.* xxiii, 2 ff. and 11 ff.) writes of "Clouds, Rainbows, etc. as Weather Prophets," W. L. Westermann (*C.J.* xxiv, 483 ff.) of "Inland Transportation and Commerce in Antiquity," Eva Sanford (*T.A.P.A.* lix, 72 ff.) of "Some Literary Interests of German Students," E. Riess, of Tendencies in the history of Ancient Religion (C.W. xxiii, 19 ff. and 25 ff.), A. P. Weston (*C.J.* xxv., 93 ff.) of "Some Aspects of Ancient Scientific Thought," Katherine Allen, of "Some Glimpses of Roman Britain" (*C.J.* xxxiv, 254 ff.), H. Canter, of "The Character of Hannibal" (*C.J.* xxiv, 564 ff.). H. Hubbell offers "Some Further Observations on the Chronology of the Year 238 A.D." (*C.P.* xxiv, 285 ff.), and E. Van Sickle (*C.P.* xxiv, 285 ff.) discusses "The Repair of Roads in Spain under the Roman Empire." K. Scott (*C.P.* xxiv, 133 ff.) writes of "Octavian's Propaganda and Antony *de sua ebrietate.*"

GREEK LITERATURE

By Robert Chisolm Horn

Professor, Muhlenberg College

Loeb Classical Library.—The recent volumes of this series, published in 1928 or 1929, are: *St. Basil*, Vols. II and III, by Roy J. Deferrari; *Athenaeus*, Vols. II and III, by C. B. Gulick; *Epictetus*, Vol. II, by W. A. Oldfather; *Plutarch, Moralia*, Vol. II, by F. C. Babbitt; *Isocrates*, Vol. II, by G. Norlin; *Procopius*, Vol. V. by H. B. Dewing; *Philo*, Vols. I and II, by F. M. Colson and G. H. Whitaker, *Theophrastus, Characters*, by J. M. Edmonds; *Strabo*, Vol. VI, by H. L. Jones; and *Oppian, Colluthus* and *Tryphiodorus*, by A. W. Mair.

Art and Archaeology.—*Daedalus and Thespis*, by Walter Miller, is the first volume to our knowledge of a study of the contributions of ancient dramatic poets of the arts and crafts of Greece. This volume is concerned with architecture and topography. The volumes to follow will deal with sculpture, and painting and ceramics. The work is well furnished with illustrations of sites and buildings (The Macmillan Co., 1929). *The Sculpture and Sculptors of the Ancient Greeks*, by Gisela Richter, is a beautiful and authoritative piece of work (Yale Univ. Press, 1929). The price will be found prohibitive to many who would like to own a copy. Two other noteworthy books are: D. S. Robertson, *A Handbook of Greek and Roman Architecture* (Cambridge Univ. Press, 1929) and J. D. Beazley, *Greek Vases in Poland* (Oxford Univ. Press, 1928). Two valuable contributions to the study of archaeology are: Carl W. Blegen, *Zygouries, A Prehistoric Settlement in the Valley of Cleonae* (Harvard Univ. Press, 1928) and George E. Mylonas, *Excavations at Olynthus*, Part I, The Neolithic Settlement (The Johns Hopkins Univ. Press, 1929). The latter is No. 6 of the Johns Hopkins University Studies in Archaeology. The excavations at Olynthus were conducted by the Johns Hopkins University under the auspices of the American School of Classical Studies in Athens. *Magic Spades*, by R. V. D. Magoffin and Emily C. Davis, is a most entertaining as well as scholarly account of archaeological discovery (Henry Holt and Co., 1929). The illustrations contribute not a little to the value of a book which will stimulate interest in archaeology.

Translations. — The demand for translations of the works of Greek authors continues strong, and this demand is being met both in England and America. *Aristotle, Topica and De Sophisticis Elenchis*, trans. by W. A. Pickard-Cambridge, is one of the volumes in *The Works of Aristotle*, translated under the editorship of W. D. Ross (Oxford Univ. Press, 1928). Several of the works of Plato have recently appeared: *The Epinomis*, translated with Introduction and Notes by J. Harward (Oxford, Clarendon Press, 1928); *Theaetetus*, translated by M. J. Levett (Glasgow, Jackson, Wylie and Co., 1929); *Timaeus and Critias*, translated into English with Introduction and Notes by A. E. Taylor (Methuen and Company, 1929). *Plutarch, The Greek Questions*, with a new translation and a commentary by W. R. Holliday, is a publication of the Oxford University Press (1928). Translations of the plays of the Greek dramatists appear frequently: Sophocles and Euripides, *Two Greek Plays*, The *Philoctetes* of Sophocles and the *Medea* of Euripides, translated by John Jay Chapman (Houghton Mifflin Co., 1928); *The Plays of Aristophanes*, translated by Arthur S. Way (The Macmillan Co., 1928); Aeschylus, *Agamemnon*, an English Version by Sir H. Sharp (Oxford Univ. Press, 1928); *Ten Greek Plays*, translated by Gilbert Murray and others, with introduction by Professor Lane Cooper and preface by Professor H. B. Densmore (Oxford Univ. Press, 1929); and *Four Famous Greek Plays*, Translations, edited with an introduction by Paul Landis (New York, The Modern Library, 1929). Homer's appeal continues as strong as that of the dramatists. *The Odyssey of Homer*, translated into English Verse by Herbert Bates, is published by Harper and Brothers (1929); and Houghton Mifflin Company have just published a new edition of *The Odyssey of Homer*, translated by George Herbert Palmer. This is in artistic form with beautiful illustrations in color by N. C. Wyeth.

Greek Language and Papyri.—We are glad to welcome Part IV of the new edition of Liddell and Scott, *Greek Lexicon* (Oxford, Clarendon Press, 1929), and Part VII of the *Vocabulary of the Greek New Testament*, by J. H. Moulton and G. Milligan (Doubleday, Doran, 1929). *The*

Zenon Papyri, Tome III, by C. C. Edgar, was published in 1928 by Bernard Quaritch in London. Among the volumes in the course of preparation in the Loeb Classical Library is one on *Papyri*, by A. S. Hunt. *Titles of Address in Christian Greek Epistolography to 527 A. D.*, by Sister Lucilla Dinneen, is Vol. XVIII of Patristic Studies (Catholic University of America Press, 1929).

Greek Literature.—Alfred Körte's *Hellenistic Poetry* has been translated into English by Moses Hadas and Jacob Hammer (Columbia Univ. Press, 1929). This is a valuable work treating of a period which deserves more study. The English edition contains a convenient bibliography, which is not found in the German. Another welcome volume by J. U. Powell and E. A. Barber is entitled *New Chapters in the History of Greek Literature, Second Series* (Oxford Univ. Press, 1929). The University of Chicago Press in 1929 published *The Delphic Maxims in Literature*, by Eliza G. Wilkins.

Greek History.—In 1928 the Cambridge University Press published the Second Volume of Plates of the *Cambridge Ancient History*, and Volume VII of this history entitled *The Hellenistic Monarchies and the Rise of Rome*. Sir William M. Ramsay's *Asianic Elements in Greek Civilization* (Yale Univ. Press, 1928) is an American publication of the Gifford Lectures in the University of Edinburgh for 1915-1916. *The Athenian Calendar in the Fifth Century*, by Benjamin D. Meritt, is an important and scholarly piece of work (Harvard Univ. Press, 1928). *The Negro in Greek and Roman Civilization*, by Grace H. Beardsley, is No. 4 of The John Hopkins University Studies in Archaeology (J. H. U. Press, 1929). *Named and Unnamed Gods in Herodotus*, by Ivan M. Linforth, is published by the University of California Press (1928), and is No. 7 of Volume VII of the University of California Publications in Classical Philology. *The Foreigners in the Athenian Ephebia*, by O. W. Reinmuth, is published as No. 9 of the Studies in Language, Literature, and Criticism (Univ. of Nebraska Press, 1929). Another book which is worthy of attention is A. E. Zimmern's *Solon and Croesus, and Other Greek Essays* (Oxford Univ. Press, 1928). We should mention here also *The Life of Alcibiades*, by E. F. Benson (D. Appleton and Co., 1929). Cyril E. Robinson, in *A History of Greece*, making use of the recent contributions of archaeology and research, presents a good and readable one-volume history, adorned with beautiful illustrations (Thomas Y. Crowell Co., 1929).

Greek Religion.—The subjects of Greek Religion and Mythology seem to have a specially strong appeal at present. In the department of Mythology these books have appeared within the past year: H. J. Rose, *A Handbook of Greek Mythology* (E. P. Dutton and Co., 1928); William Sherwood Fox, *Greek and Roman Mythology* (Marshall Jones Co., 1928); and G. Howe and G. A. Harrer, *A Handbook of Classical Mythology* (New York, F. S. Crofts and Co., 1929). The Johns Hopkins University Press in 1929 published as No. 5 of its Studies in Archaeology *Les Cultes de Patras*, by Jules Herbillon, a well known Belgian scholar. Among the books which touch the subject of religion are: E. Bevan, *Sibyls and Seers*, Some Ancient Theories of Revelation and Inspiration (London, Allen and Unwin, 1928); Arthur E. Weigall, *The Paganism in Our Christianity* (G. P. Putnam's Sons, 1928); S. Angus, *Mystery Religions and Christianity* (Charles Scribner's Sons, 1929); and Elizabeth Goldsmith, *Ancient Pagan Symbols* (G. P. Putnam's Sons, 1929).

Greek Philosophy.—The volume entitled *Platonism* by John Burnet is the publication of the Sather Lectures of 1926 (Univ. of California Press, 1929). This is the last work of Professor Burnet who did not live to see his book in published form. In 1928 the Oxford University Press published *The Greek Atomists and Epicurus*, by Cyril Bailey. In the course of the present year Alfred A. Knopf published *Greek Thought and the Origins of the Scientific Spirit*, by Leon Robin, The translation was made by M. R.

Dobie. This is one of the volumes in the *History of Civilization. The Greek Sceptics*, by Mary Mills Patrick, is published by the Columbia University Press (1929).

Greek Life and Civilization.—Among the important English publications of the past year are: *Aegean Civilizations*, edited by Sir Henry Lunn (London, Ernest Benn, 1928); *The Civilization of Greece in the Bronze Age*, by H. R. Hall (Methuen and Co., 1928); and R. W. Livingstone, *The Mission of Greece, Some Views of Life in the Roman World* (Oxford Univ. Press, Amer. Branch, 1928). The last mentioned book contains many extracts in English translation from less known Greek writers. who were well known to the Roman world. Longmans, Green and Company announce that they will publish in the near future these two volumes in the series entitled *Our Debt to Greece and Rome: The Greek Fathers* by J. M. Campbell, and *The Attitude of the Greeks and Romans toward Nature*, by H. R. Fairclough. As descriptions of particular departments of Greek life there may be mentioned L. Lamprey, *Children of Ancient Greece* (London, George G. Harrap and Co., 1928), and C. A. Forbes *Greek Physical Education*, published in the Century Educational Series (The Century Co., 1929). An interesting book of a very different type is Edward Hutton's *A Glimpse of Greece* (The Macmillan Co., 1928). Those who are interested in the educational value of the classics will be glad to read *The Classics, Their History and Present Status in Education*, by Felix M. Kirsch. This is described as a Symposium of Essays on Education and is published by the Bruce Publishing Company in Milwaukee (1928).

SEMITIC LANGUAGES AND LITERATURE

By George A. Barton

Professor, University of Pennsylvania

ARCHAEOLOGICAL STUDIES

Palestine.—The year 1929 has been productive in this field. In February Professor Elihu Grant's *Beth-Shemesh* was published by Haverford College. It records the progress of the author's excavation of this ancient Palestinian site made during his first season's work there. The volume is a report of progress rather than a complete presentation of the archæological history of the site. Dr. Grant was, however, fortunate in discovering three cemeteries outside the city walls, the earliest of which belongs to the Canaanite period after 1800 B.C., and the latest to the early iron age, about 1100 B.C. In the interval the Philistines had invaded the land and styles of pottery bearing designs which betray influences from across the sea are revealed. The record of discovery is told in a way that enables the reader to follow the steps of the work, appreciate the types of pottery found, and see the movements of the ancient peoples who created them across the surrounding country. In March, 1929, the Oriental Institute of the University of Chicago published as No. 4 of its Communications *The Excavation of Armageddon* by Clarence S. Fisher. This is a brief preliminary report of the main discoveries made during 1925-27, the two seasons when Dr. Fisher was Director of the Institute's excavation of Megiddo—a work which will occupy many years, and the full publication of which will not be made until the work is completed. Schumacher had in 1903 excavated a part of the mound: Fisher's discoveries extend and supplement those made by Schumacher. The most important discovery reported is a fragment of a stele of Sheshonq (Shishak of the Bible), who conquered Palestine after the death of King Solomon. The report bears the mark of Fisher's masterly archæological skill.

Egypt.—In May the same Institute published as No. 5 of its Communications *Medinet-Habu, 1924-28,* by Harold H. Nelson and Uvo Hoelscher. The publication gives a preliminary account of the scientific methods by which the Institute is recovering the archæological remains left by Rameses III and recording accurately his inscriptions.

Babylonian Empire.—In the early summer the Yale University Press published *Nabonidus and Belshazzar, a Study of the Closing Events of the Neo-Babylonian Empire,* by Professor Raymond S. Dougherty. The book, which is a model of historical investigation, presents new cuneiform material, which puts the character and administration of Nabonidus in an entirely new light and gives a new key to the understanding of the events of his reign and the position of his son Belshazzar. In connection with the new cuneiform material all references in Biblical and Greek writers to Nabonidus and Belshazzar are examined and sifted.

Iraq.—During the summer the Harvard University Press issued as Volume V of the Harvard Semitic Series *Excavations at Nuzi conducted by the Semitic Museum and the Fogg Art Museum of Harvard University, with the Coöperation of the American School of Oriental Research at Baghdad,* Volume I, Texts of Varied Contents selected and copied by Edward Chiera. The book contains one hundred and seven well preserved texts from Nuzi, the site near Kirkuk where, in 1925, Professor Chiera discovered in the region of ancient Arrapkha the remains of a hitherto unsuspected people. In 1927 Chiera published a volume of business documents in the Publications of the Baghdad School; they were *Inheritance Texts.* The Harvard volume contains tablets excavated on the same site during the season 1927-28, but the texts here published are not confined to one subject; they include adoptions, sale-adoptions, wills, marriage contracts, loans, purchases of slaves, and letters. The copies are made in Chiera's usual beautiful cuneiform hand, and with his usual accuracy, Volume IX of the *Annual* of the American Schools of Oriental Research, published in November, contains an article on "Beth-shemesh" by Dr. Grant, whose book is mentioned above, and "Preliminary Excavation at Tepe Gawra" by Professor E. A. Speiser. Dr. Speiser, Annual Professor in the American School at Baghdad, 1926-27, and Honorary Fellow, 1927-28, conducted an archæological survey of the mounds in northeastern Iraq, and made a brief excavation at Tepe Gawra, where he found the remains of three distinct civilizations, the latest of which was Sumero-Akkadian of pre-Sargonic days. The mound, then, which is seventy feet high, ceased to be inhabited by 2500 B.C. Dr. Speiser's article is a model of archæological presentation.

THE SYNAGOGUE AND THE CHURCH

Quite different from these archæological publications is *The Origins of the Synagogue and the Church* by the late Kaufmann Kohler, edited by H. G. Enelow, which was published by the Macmillan Company in February. Dr. Kohler was a great scholar and one of the outstanding pillars of Reform Judaism. The real beginnings of the synagogue are shrouded in obscurity—an obscurity which even Dr. Kohler could not penetrate. His book gives an authoritative sketch, however, of the growth of the liturgy and of the schools which grew up in connection with the synagogue. His sketch of the origins of the Church are not so authoritative. That he should treat them at all, and should reach the degree of fair-minded objectivity that he does, belonging to a race that has suffered so much from Christians, is eloquent testimony to his scholarly detachment. He has not, however, followed the most scholarly authorities as to the literary origins of the Gospels and early Christian literature.

INSCRIPTIONS AND LITERATURE

Sumer and Akkad.—In November the Yale Press published as the first volume of the Library of Semitic Inscriptions, projected by the late Professor A. T. Clay, *The Royal In-*

scriptions of Sumer and Akkad by Professor G. A. Barton. The work contains all the historical material in the Sumerian and Akkadian languages written prior to the first dynasty of Babylon. It is the first time that so extensive a collection of this material has been presented in English. A French scholar some years ago published a similar work both in French and German, but the latest of his editions is now more than twenty years old and the accessible material has increased enormously in the intervening years.

"At the end of November the University of Chicago Press published *Sumerian Lexical Texts from the Temple School at Nippur* by Professor Edward Chiera—an important volume, prepared with Chiera's well known scholarship and skill."

The Druses.—The Columbia University Press has recently published an *Autobiography of Ousami Ibn Munkidh*, a man of the Crusades period, edited and translated by the competent hand of Professor Philip Hitti of Princeton University. It announces also a book by the same author on the *Origin and Religion of the Druses* to appear before the end of the year.

Miscellaneous Reviews.—In addition to the volumes mentioned, important contributions have been made to our knowledge of Semitic languages and literatures in periodical literature. Among these the following are worthy of especial mention: "The Slavonic Josephus and its Relation to Josippon and Hegisippus" by Solomon Zeitlin in the *Jewish Quarterly Review* (XX, 1-50); "The Pharisees, their Origin and Philosophy" by Louis Finkelstein in the *Harvard Theological Review* (XXII, 185-261); Jahjā Ibn 'Adi on Character-Training by Mar Severius Afram Barsaum in the *American Journal of Semitic Languages* (XLV, 1-34 and 94-129); "Aaronites and Zadokites" by T. J. Meek (*Ibid.* 149-166); "Ur of the Chaldees: More Royal Tombs" by C. Leonard Woolley, *Museum Journal* (March, 1929, 7-35); "The Palestine Expedition" (to Beisan) by Alan Rowe (*Ibid.*, 37-87); "The Two Royal Stele of Bethshean" by Alan Rowe (*Ibid.*, 89-98); "Letter of Saushshatar and the Date of the Kirkuk Tablets" by E. A. Speiser, *Journal of the American Oriental Society* (XLIX, 269-275); and "Whence Came the Sumerians?" by G. A. Barton (*Ibid.*, 263-268).

INDO-EUROPEAN LINGUISTICS

By E. H. Sturtevant

Professor, Yale University

LINGUISTIC CONFERENCE

The outstanding event of the year 1929 was the Conference on a Linguistic Atlas of the United States and Canada, which was convened by the American Council of Learned Societies in coöperation with the Linguistic Society of America. Fifty scholars met in New Haven on Aug. 2 and 3 to discuss plans for mapping the linguistic features of the two countries. A committee, of which Professor H. Kurath is chairman, was appointed to draw up a budgeted plan, and it is hoped that work can soon be started upon the only part of the material for which adequate preliminary studies have been made, namely the dialects of English. An account of the Conference has been published in *Bulletin* No. 4 of the Linguistic Society of America (pp. 20-47). A preliminary contribution is "A Bibliography of American Pronunciation 1888-1928" (*Language* 5. 155-62), by H. Kurath.

GENERAL AND COMPARATIVE INDO-EUROPEAN LINGUISTICS

Speech Sounds.—In "Relative Frequency as a Determinant of Phonetic Change" (*Harvard Studies in Classical Philology* 40. 1-95), G. K. Zipf shows that the several speech sounds tend to occur in all languages with about the same relative frequency. When a sound becomes more frequent than this it tends to be either weakened or lost, while sounds that become relatively infrequent tend to be strengthened. *Why English Sounds Change* (New York: The Ronald Press, pp. VII + 146), by Janet R. Aiken, Dr. Aiken tabulates the English speech sounds according to the position of the upper surface and tip of the tongue in their production, and shows that a great many English sound changes result in a decrease in the movement of this part of the tongue. She thinks that her results are valid for speech in general, but she does not make the application to other languages than English. Dr. Zipf and she will have to reconcile their theories before either can be accepted.

Publications.—"Grammatical Processes: Incremental *vs.* Autonomic" (*Language* 5. 117-8), by J. de Angelo. "An Explanation of the Differences in Length and Voicing of Consonants in French and English" (*Modern Philology* 26. 339-51), by J. L. Barker. "Linguistics and Philology" (*Language* 5. 27-32), by G. M. Bolling. "Propriety in the Light of Linguistics" (*Modern Philology* 26. 415-26), by Klara H. Collitz. "The Word and the Sentence" (*Language* 5. 163-88), by W. L. Graff. "Tendencies in Pronunciation" (*The English Journal* 18. 646-53), by E. R. Hunter. "Inner Form" (*Language* 5. 000-00), by W. Leopold. "Etymological Miscellanies" (*ibid.* 147-54), by F. R. Preveden. "Restwörter" (*Modern Philology* 26. 459-65), by E. Prokosch. "The Status of Linguistics as a Science" (*Language* 5.), by E. Sapir.

INDO-IRANIAN LINGUISTICS

"On Diminutive Pronouns in Jaina Sanskrit" (*Indian Studies in Honor of Charles Rockwell Lanman*, Harvard University Press, 7-25), by M. Bloomfield. "Notes on Jaina Māhārāstrī (*ib.* 27-30), by F. Edgerton. "Three Indo-Iranian Notes" (*ib.* 253-8), by A. V. W. Jackson. "The Term *ročvarmh* in a Turkish Manichaean Fragment" (*Language* 5. 97-9).

THE CLASSICAL LANGUAGES

"The Forms and Functions of the Subjunctive in the Classical and Modern Languages" (*Modern Philology* 26. 387-99), by G. O. Curme. "The Meaning of *πον* in Homer" (*Language* 5. 100-5), by G. M. Bolling. "The Hypothesis of the Italo-Celtic Impersonal Passive in r" (*ib.*), by E. F. Claflin. "Indefinite *Quis* and Horace, *Serm.* 2. 1. 37" (*Proceedings of the American Philological Association* 59. xxx), by R. C. Flickinger. "The Cookery Inscription from Praeneste" (*Language* 5. 18-22), by R. G. Kent. "The Names of the Jews of Ancient Rome" (*Transactions of the American Philological Association* 59-205-24), by H. J. Leon. "*Vocis Flexus, Modulatio*, and *Plasma* in Latin Phonology" (*ibid.* 5-8), by M. H. Liddell. "The Semantics of the Termination *-ario-*" (*American Journal of Philology* 50. 40-63), by E. W. Nichols. "The Homeric Gloss: A Study in Word-Sense" (*Transactions of the American Philological Association* 59. 233-47), by M. Parry. "Praenestine *asom fero*" (*Language* 5. 15-7), by Pauline Turnbull.

THE ROMANCE LANGUAGES

"Doublets in the Language of Rabelais" (*Language* 5. 106-12), by A. D. Menut. "Spanish Etymologies" (*ib.* 23-6), by C. C. Rice. "Etymological Vocabulary to the *Libro de Buen Amor* of Juan Ruiz" (Yale University Press), by H. B. Richardson.

CELTIC AND GERMANIC

"The Ogham Genitive Singular in *-ais*" (*Language* 5.), by L. H. Gray. "Notes on the Preverb *ge-* in Alfredian English" (*Studies in English Philology in Honor of Frederick Klaeber* 79-102), by L. Bloomfield. "The Onomatopoea of the German Verbal Suffix *-tschen*" (*Modern Philology* 26. 401-14), by F. W. Bradley. "Epithetic Compound Folk-Names in *Beowulf*" (*Studies in English Philology* 120-34), by W. F. Bryan. "Concerning the Origin of the Gerund in English" (*ib.* 32-49), by M. Callaway. "The Injunctive in Gothic" (*Modern Philology* 26. 427-32), by E. P. Davis. "Studies in the Syntax of the Old English Passive with Special Reference to the Use of *wesan* and *weordan*" (*Language Dissertations*, published by the Linguistic Society of America, No. 5. pp. 80), by Louise G. Frary. "Gothic *hiri*" (*The Journal of English and Germanic Philology* 28. 343-59), by R. M. S. Heffner. "Semantic Borrowing in Old English" (*Studies in English philology* 50-72), by S. Kroesch. "The Semantic Development of Old English *craeft*" (*Modern Philology* 26. 433-43). "German Lexicography," Part VI (*Modern Language Notes* 44. 137-47), by W. Kurrelmeyer. "Recurring First Elements in Different Nominal Compounds in *Beowulf* and the *Elder Edda*" (*Studies in English Philology* 73-8), by F. P. Magoun. "The Problem of Standard Speech" (*The English Journal* 18. 146-56), by K. Malone. "Sprachgeschichte und Sprachunterricht" (*Monatshefte für Deutschen Unterricht* 21. 1-5, etc.), a series of papers continued from the previous year by E. Prokosch. "Certain Old Norse Suffixes" (*Modern Philology* 26. 465-76), by A. M. Sturtevant. "Morphological Notes" (*Studies in English Philology* 28-31), by F. A. Wood. "Is the Use of *wesan* in the Periphrastic Actional Passive in the Germanic Languages Due to Latin Influence?" (*The Journal of English and Germanic Philology* 28. 360-5), by A. J. F. Ziegelschmid.

LITHUANIAN AND HITTITE

"On the Declension of Substantive Compounds in Lithuanian" (*American Journal of Philology* 50. 156-67), by F. T. Wood. "Lithuanian *damlākas* 'chimney-flue'" (ib. 168-9). "A Hittite Manual for Beginners; The Treaty of Mursilis with Kupanta-KAL, Transliterated and Translated with Vocabulary" (Paris: Geuthner, pp. xxix + 85) by G. A. Barton. "Some Nouns of Relationship in Lycian and Hittite" (*Transactions of the American Philological Association* 59. 48-56), by E. H. Sturtevant. —"Hittite Denominatives in *a* (*i*) and One Source of Indo-European Nouns in Long *ā*" (*Language* 5. 8-14). "Place Whither in Hittite and the Use of Proper Nouns in the Stem Form" (*ib.* 139-46). "Some Hittite Words" (*ib.*).

LIBRARIES

BY BEATRICE SAWYER ROSSELL

PUBLICITY ASSISTANT, AMERICAN LIBRARY ASSOCIATION

GENERAL

Scope of Library Service.—American libraries are chiefly concerned with the extension of library service to rural as well as urban communities; the promotion of educational services to adults; the raising of professional library standards, and the advancement of international library coöperation.

Libraries and Circulation.—More than 5,469 libraries in the United States now report collections of 3,000 or more volumes; 83 have 200,000 volumes or more. The total circulation for all libraries in the United States is not available but reports of libraries in 37 leading cities show a circulation of more than 114 million books during the last year, an increase of more than a million over the preceding year. Public libraries with the largest circulation in 1928-29 were: Chicago, 14,128,771; New York (exclusive of Brooklyn and Queens), 10,877,171; Los Angeles, 8,414,009; those with the largest per capita circulation: Cleveland, 8.055; Milwaukee, 7.524; Rochester, 7.441. In spite of these figures, it is estimated that there are still between 45,000,000 and 50,000,000 people without adequate library service in the United States and Canada.

COUNTY LIBRARIES

Number.—Twelve new county libraries were reported between January and October this year, making a total of 276 in the United States.

State Appropriations.—Five state library extension agencies were also established in the same period. In Colorado the Library Commission, formed from two older bodies, was granted an appropriation of $4,500; in New Mexico, the Library Extension Service, an appropriation of $2,000. Similar bodies in Montana, South Carolina and West Virginia were organized without appropriation. Mississippi granted $5,000 for each of the years 1928 and 1929, for the state library commission appointed in 1926 without appropriation. A state library association was formed in Wyoming in October, Mrs. Clare Ausherman of Cheyenne, state librarian, being elected the first president.

Southern library development was promoted by grants to certain counties from trustees of a recently created Julius Rosenwald Fund, the grants being always conditional upon local library support. Among the earliest counties to receive such grants were Webster Parish, Louisiana; Davidson and Mecklenburg counties, North Carolina, and Hamilton County, Tennessee.

Legislation.—New laws permitting counties to establish libraries were passed in Arizona, Colorado, Delaware, Oklahoma and Tennessee, the last state replacing a law the constitutionality of which was questioned. States in which county library establishment must still wait on legislative action are Florida, Georgia, Idaho, North Dakota and Washington.

Rural Library Extension.—The further extension of rural libraries was discussed at an important conference held in Chicago last December, when forty representatives from the U. S. Bureau of Education, the Department of Agriculture, universities, colleges, educational foundations, farmers' organizations, farm papers and industries definitely related to rural life, met with the American Library Association Committee on Library Extension. The interest expressed by rural leaders enforced the conclusion that the county library, under trained librarians, and adequately supported by public funds, best served rural communities, and that all national and state agencies concerned with rural progress shared the opportunity and responsibility for furthering county library development.

ADULT EDUCATION SERVICE

Individual and Group Study.—Public libraries throughout the country continued to develop and enlarge their services to adults who wish to pursue their studies alone rather than in classes or organized groups; thirty-four readers' advisers in as many public libraries being employed to give consulting and advisory service supplemented by suitable books. Service of books and printed material was extended to groups, study clubs, classes and labor organizations, meeting either within the library or elsewhere. In some cases, librarians were responsible for the formation of study groups, and gave impetus to the organization of reading and study clubs.

Educational surveys were made, and directories of educational opportunities for adults were published by some libraries which act as community centers of information regarding courses offered by night schools, Y.M.C.A.'s, business colleges and similar institutions.

"Reading With a Purpose" Courses.—The small library, unable to afford a readers' adviser, offered adult education service through the "Reading with a Purpose" courses published by the American Library Association. Each course, written by an authority and consisting of a short essay, followed by a recommended list of five or six books, gives the reader a fairly comprehensive grasp of a specific subject. Courses published in 1929 were: *Human Body and its Care*, by Morris Fishbein; *Journalism*, by Willard G. Bleyer; *Economics*, by Walton H. Hamilton; *Mental Hygiene*, by Frankwood E. Williams; *Advertising*, by Earnest E. Calkins; *Romance of Modern Exploration*, by Fitzhugh Green; *Salesmanship*, by John A. Stevenson; *Capital and Labor*, by John A. Fitch, and *Home Economics*, by Helen W. Atwater.

Advisory Courses.—As an aid to librarians attempting to help the reader of limited cultural background, who seeks information in books of a simple and non-technical nature, *Readable Books in Many Subjects* was prepared by Emma Felsenthal under the direction of the American Library Association. A study of factors contributing to good reading habits and those governing the lack of such habits, begun last year by a joint committee of the American Library Association and the American Association for Adult Education, was completed this year and published by the Macmillan Company under the title *The Reading Interests and Habits of Adults.*

LIBRARY SCHOOLS

Curricula.—1,019 students attended the accredited library schools during the year 1928-29. Sixteen library schools which offer opportunities for graduate and undergraduate study are now fully accredited by the Board of Education for Librarianship of the American Library Association, and two others have been provisionally accredited. In addition to these, there are at least eight schools, some of them recently opened, several of which are offering a full year's curriculum in library science for school library work. Every summer many of the accredited schools and a number of universities are offering summer courses in library science. Extension courses in residence in library science are now being offered by a number of schools and correspondence courses are offered by at least one library school.

Textbooks.—Basic subjects in library training are covered in textbooks now under preparation by the Board of Education for Librarianship. *Circulation Work in Public Libraries*, by J. M. Flexner, has been completed; *Reference Work*, by J. I. Wyer, is in press and the following books are under revision: *Selection and Acquisition of Books for Libraries*, by F. K. W. Drury; *Introduction to Cataloging and the Classification of Books*, by Margaret Mann; *The Library in the School*, by L. F. Fargo, and *Library Service to Children*, by E. L. Power.

Student Aid.—Of particular interest are the fellowship grants offered by the Carnegie Corporation of New York for study and research in library problems, and the Caroline M. Hewins Scholarship offered this year for the first time to young women preparing for work with children in public libraries. Most of the accredited library schools have at their command some form of student aid either as a scholarship or loan fund. Several state library associations and library clubs also offer scholarships or loan funds.

AMERICAN LIBRARY ASSOCIATION CONFERENCE

Newbery Medal Award.—The fifty-first annual conference of the American Library Association held at Washington, D. C., during the week of May 13 was attended by over 2,700 of the 11,000 members of the Association. The John Newbery medal, given annually by the Section for Library Work with Children of the A.L.A. for the most distinguished children's book of the year, was awarded to Eric Kelly for his book, *The Trumpeter of Krakow.*

Round Tables and Meetings.—The usual meetings of college, school, county, reference, children's, agricultural and hospital librarians were held. There were round tables on adult education, library extension, religious books, small libraries, radio broadcasting, moving pictures in connection with the work of the library, library work with the blind and the foreign born. Meeting with the Association were the American Association of Law Libraries, the American Library Institute, the Bibliographical Society of America and the Special Libraries Association.

Election of Officers. — Officers elected for the year 1929-30 were Andrew Keogh, librarian, Yale University, New Haven, Connecticut, president; Everett R. Perry, librarian, Public Library, Los Angeles, California, first vice-president; Jennie M. Flexner, Public Library, New York City, second vice-president; Matthew S. Dudgeon, librarian, Public Library, Milwaukee, Wisconsin, treasurer; Linda A. Eastman, librarian, Public Library, Cleveland, Ohio, and

Judson T. Jennings, librarian, Public Library, Seattle, Washington, for members of the Executive Board; and John W. O'Leary, the National Bank of the Republic, Chicago, Illinois, trustee of endowment funds. President Hoover was elected honorary member of the Association and Dr. Tietse Pieter Sevensma, librarian of the League of Nations, was made a corresponding member.

BIBLIOGRAPHY

Union List Mss. and Books.—Several important bibliographical undertakings were begun or extended during the year. A Rockefeller grant of $35,000 made possible a Union List of volume manuscripts before the year 1500 in American Libraries, the grant being administered under the direction of the Librarian of Congress, and the list edited by Seymour De Ricci. A committee of scholars representing the Modern Language Association and the Council of Learned Societies, of which Professor Blake of Harvard is chairman, serves in an advisory way. The Union Catalog at the Library of Congress of unusual books in American libraries generally, also organized under a Rockefeller grant, was increased to 5,551,406 locations. A Supplement to the A.L.A. Index or Union Catalog of Serials in American Libraries was undertaken and is well under way.

International Catalog.—The Smithsonian Institution continued the work of compiling American titles for the international catalog of scientific literature and took the initiative in an effort to secure the publication of unprinted material of the international catalog now amounting to about 3,000,000 titles.

Foreign Bibliography.—The Pan-American Union in carrying out the resolution of the Havana Conference organized a bibliographical Pan-American conference to be held in Havana next year and as part of this prepared an extended program of bibliographical effort in this field. The first and second parts of the preliminary edition of the *List of Serial Publications of Foreign Governments*, containing records of serials of the Pan-American states other than the United States, and the British Overseas Empire, except Canada, were distributed to libraries willing to cooperate by checking, and Winifred Gregory, the compiler, has completed records of serials of Switzerland, Belgium and the Netherlands. The French list is nearing completion and those for the Baltic states, Finland, Latvia and Lithuania are in preparation. The lists are being carefully prepared for the American Council of Learned Societies, the American Library Association and the National Research Council.

A.L.A. Publications.—Among library aids published during the year by the American Library Association were the following: *Budgets, Classification and Compensation Plans for University and College Libraries; College and Reference Yearbook No. 1; Children's Library Yearbook No. 1; Guide to Reference Books*, fifth ed.; *The Public Library in the United States*, by A. E. Bostwick, and *School Library Yearbook No. 3. International Relations.*

SCHOOL LIBRARIES

Outstanding events of the year included courses for school librarians offered at McGill University Library School and at the new library school at the University of Minnesota; a five year state-wide demonstration of school library service begun under the Louisiana Library Commission; the revision of the Teachers College Measuring Stick (to appear in *School Library Yearbook, No. 4*); the marked development of training for teacher librarians in New York state and the publication by the American Library Association of *School Library Yearbook No. 3*. California school librarians published a handbook and a list of books for senior high schools, and the Ontario Library Association, for the first time, turned its attention to school library work. Typical of progress in certain cities was the development of curriculum construction, library organization and administration in Denver, the central cataloging department in Los Angeles, the new quarters in Long Beach and the central school library department in San Francisco.

LIBRARY LEGISLATION

A sub-committee to the American Library Association committee on Legislation was established in 1928 to study and make constructive suggestions with regard to problems of library legislation. While the review of 1929 legislation is incomplete, laws, not already mentioned under County Libraries, permitted an increased tax levy in Illinois; provided for a library and historical building in Indiana; amplified the law providing that in cities and villages of less than two thousand the school board may maintain a public library, in Minnesota; permitted the library board in cities of the first class to pension the librarian after twenty-five years of service at the age of seventy and amended the law regarding trustees to read that four of five trustees (formerly all five) must be residents of the municipality served, in New Jersey, and abolished the State Library Commission in the state of Washington, transferring its duties to the superintendent of public instruction.

INTERNATIONAL COÖPERATION

Mexico.—More friendly and mutually helpful relations were established between American and foreign libraries. Coöperation between Mexico and the United States was furthered when Senor Joaquin Diaz Mercado was appointed member for Mexico to the A.L.A. Membership Committee, Annie S. Cutter was the guest of honor at the sixty-first anniversary celebration of the founding of the National Library of Mexico, and current lists of books published in Mexico were issued.

Congress at Rome and Venice.—Many American librarians attended three world conferences of significance to the library profession. Seventy, including Andrew Keogh, president of the Amercian Library Association, Herbert Putnam, W. W. Bishop and Carl H. Milam, were present at the world Library and Bibliographical Congress at Rome and Venice in June, when an International Association of Librarians was formed and resolutions were passed recommending the international exchange of librarians, professors and students of library economy; the improvement of international aids to students, and the establishment and maintenance of national libraries and library schools where they do not already exist were also recommended.

South Africa. — Nearly thirteen thousand pounds were appropriated by the Carnegie Corporation of New York for school libraries, library service to natives, libraries for the blind and for other purposes in the Union of South Africa, as a result of recommendations made by Milton J. Ferguson, state librarian of California, and S. A. Pitt, city librarian, Glasgow, Scotland, after last year's survey, authorized by the Corporation. The chief weaknesses of South African libraries were found to be: organization on a subscription basis which limited service, increased costs and overlooked the needs of children and schools; the lack of a powerful national library legislation necessary to library development, and improved standards in library training.

FUNDS FOR LIBRARY WORK

Grants To Colleges.—In addition to the 13,000 pounds appropriated for the Union of South Africa by the Carnegie Corporation of New York, the Carnegie scholarship grants, the Rockefeller grant and the fund for prison library research provided by the Bureau of Social Hygiene, New York, all mentioned elsewhere in this article, other notable amounts contributed for library work this year include $1,750,000, given to the University of Michigan by W. W. Cook of New York for the erection of a new law library; $500,000, provided for the Yale University library fund by Otto T. Barnard; $400,000 given to Fisk University for a new library by the General Education Board, and $50,000 donated to the St. Louis Public Library, by George T. Steedman, for the establishment, housing and upkeep of an architectural library.

Foreign.—A grant of the Carnegie Endowment for International Peace enabled two official delegates to attend the International Library Congress in Rome and permitted the American Library Association to finance extensive exhibits at Geneva, Seville, Rome, Venice and Kyoto, Japan.

Prison Library Research.—The sum of $3,000 was given this year to the A.L.A. Committee on Institution Libraries by the Bureau of Social Hygiene for the purpose of conducting prison library research in Massachusetts for one year. Massachusetts was chosen because the state has five classified state prisons for men and several county jails, thus offering a wide field of activity, and also because the chairman of the A.L.A. Committee on Institution Libraries, E. Kathleen Jones, was on the staff of the Massachusetts Division of Public Libraries and in charge of state and county institution libraries. Myron W. Fuller, the research worker, will practically live in men's prisons for a year, studying prison library administration and book selection with a view to establishing guiding principles for prison libraries throughout the United States.

NEW LIBRARY BUILDINGS

University libraries have shown the greatest activity in building during the past year. The University of North Carolina dedicated its new $625,000 library at Chapel Hill Oct. 19; Lehigh University Library, Bethlehem, Pa. began a $500,000 addition; Loyola University, Chicago, began a $300,000 building, the gift of Edward Cudahy, and the University of Cincinnati, the University of Rochester, and Fisk University, Nashville, Tenn. also began new structures.

Memorial Libraries.—Five memorial libraries were dedicated: the B. J. Jones Library at Aliquippa, Pa., costing $392,000; the Laughlin Memorial Library, Ambridge, Pa., costing $300,000; the Louis Latzer Library at Highland, Ill., costing $100,000; the Rauh branch of the Indianapolis Public Library, and the Warner Library at Tarrytown, N. Y.

COGNATE SOCIETIES

GENERAL

AMERICAN ACADEMY OF ARTS AND LETTERS, 633 W. 155th St., New York City.

AMERICAN ACADEMY OF ARTS AND SCIENCES, 28 Newbury St., Boston, Mass.

AMERICAN BOOKSELLERS' ASSN., 15 Park Ave., New York City.

AMERICAN COUNCIL OF LEARNED SOCIETIES, 23 University Hall, Cambridge, Mass.

AMERICAN LIBRARY ASSN., 520 No. Michigan Ave., Chicago, Ill.

AMERICAN NEWSPAPER PUBLISHERS' ASSN., 270 Madison Ave., New York City.

AMERICAN PHILOSOPHICAL SOCIETY, Independence Sq., Philadelphia, Pa.

AMERICAN SOCIETY OF COMPOSERS, AUTHORS AND PUBLISHERS, 1501 Broadway, N. Y. C.

AMERICAN SOCIETY OF NEWSPAPER EDITORS, The Journal, Milwaukee, Wis.

ASSOCIATED PRESS, 383 Madison Ave., New York City.

ASSOCIATION OF FOREIGN PRESS CORRESPONDENTS IN THE U. S., 66 Broadway, N. Y. C.

ASSOCIATION OF NATIONAL ADVERTISERS, 420 Lexington Ave., New York City, N. Y.

ASSOCIATION OF NEWSPAPER ADVERTISING EXECUTIVES, Indianapolis News Bldg., Indianapolis, Ind.

BIBLIOGRAPHICAL SOCIETY OF AMERICA, Grosvenor Library, Buffalo, N. Y.

GERMAN PRESS CLUB OF N. Y., 21 Frankfort St., N. Y. C.

MODERN LANGUAGE ASSN. OF AMERICA, New York University, N. Y. C.

NATIONAL ASSN. OF BOOK PUBLISHERS, 347 Fifth Ave., N. Y. C.

NATIONAL EDITORIAL ASSN., 131 E. 6th St., St. Paul, Minn.

NATIONAL INSTITUTE OF ARTS AND LETTERS, 633 W. 155th St., N. Y. C.

NATIONAL PUBLISHERS' ASSN., 15 W. 37th St., N. Y. C.

PEOPLES INSTITUTE, 70 Fifth Ave., N. Y. C.

UNITED PRESS ASSN., 61 Park Row, N. Y. C.

U. S. PUBLISHERS ASSN., INC., 522 Fifth Ave., N. Y. C.

AMERICAN LITERATURE

AMERICAN DIALECT SOCIETY, Warren House, Cambridge, Mass.

AUTHORS GUILD, 2 East 23rd St., New York City.

AUTHORS LEAGUE OF AMERICA, INC., 2 E. 23rd St., N. Y. C.

CATHOLIC WRITERS GUILD OF AMERICA, 128 W. 71st St., N. Y. C.

NATIONAL ASSN. FOR AMERICAN SPEECH, 2480 Broadway, New York City.

NATIONAL COMMITTEE TO STUDY JUVENILE READINGS, 1 Madison Ave., N. Y. C.

SIMPLIFIED SPELLING BOARD, Lake Placid Club, Essex County, New York.

LANGUAGE AND LITERATURE

AMERICAN CLASSICAL LEAGUE, First National Bank Bldg., Princeton, N. J.

AMERICAN ORIENTAL SOCIETY, Yale University, New Haven, Conn.

AMERICAN PHILOLOGICAL ASSN., Trinity College, Hartford, Conn.

AMERICAN PHILOLOGICAL ASSN., Wesleyan University, Middletown, Conn.

DANTE LEAGUE OF AMERICA, INC., 15 Gramercy Park, New York City.

DICKENS FELLOWSHIP OF NEW YORK, 119 E. 19th St., New York City.

GROSVENOR LIBRARY, 383 Franklin St., Buffalo, N. Y.

INTERNATIONAL DANTE SOCIETY, 15 W. 107th St., New York City.

MODERN LANGUAGE ASSN. OF AMERICA, Bryn Mawr College, Bryn Mawr, Pa.

DIVISION XXVI

THE ARTS

ARCHÆOLOGICAL DISCOVERY

By Ralph Van Deman Magoffin

Professor, New York University

UNITED STATES

Metropolitan Museum.—A Greek bobbin of two disks fastened by a small cylinder; work of the so-called Penthesileia painter, according to Dr. Richter, two Greek plastic vases each showing a squatting satyr holding a funnel-shaped vessel in his arm, a life-size marble head of a horse—middle of fourth century B. C.—and a marble statue of Protesilaos, a Roman copy of a Greek original in bronze of about the middle of the fifth century B. C. have been acquired for the classical collection.

New Mexico.—The research excavations in Chaco Canyon by the joint graduate summer school of the School of American Research at Santa Fe and the University of New Mexico, under Director Hewett, finished the clearing of the East Tower of Chetro Ketl in Chaco Canyon. Three levels of rooms were found, three rooms being decorated with pictographs traced in the plaster. All the kivas and fire pits were cleaned out, much work was done in the ceremonial bowl, the central altar was discovered. The refuse heaps were full of shards, bone implements, and arrow points.

Alamogordo.—The Museum of New Mexico and the University of Kansas, under Wesley Bradfield, excavated thirty-four rooms in two pueblos. The finds were pottery, stone axes, metates, arrow-shaft polishers, and chunks of colored ochre paints.

Jemez Canyon.—Thirty-eight burials were removed during the summer field work. Arrowheads, bone awls and scrapers, stone hatchets and bowls were found in considerable numbers, and removed to the state university for student use.

Jemez Province.—Hewett and Fisher discovered the largest pueblo ruin thus far found. It is 175 x 125 yards in extent, with numerous kivas, plazas, and dumps. Much pottery was found in the preliminary survey, consisting of Jemez gray ware, and much polychrome with and without glaze.

Pecos.—Kidder, of Phillips Andover, continued his work on the pueblo, working at classification of pueblo cultures.

AFRICA

South Africa.—The discovery of petroglyphic representations of a white and of a black rhinoceros cut in basaltic rock near Pretoria, dating 50,000 B. C., seems to make Southern Africa an important center for Paleolithic art.

Hippo.—Statues of Aesculapius, Hercules, and Minerva were found in clearing the Baths of Septimius Severus. The most interesting finds were in a Roman sewer; they were a marble head of a statue and a fragment of a bowl on which were engraved Adam, Eve, and the serpent.

EGYPT

Thebes.—Winlock of the Metropolitan Museum has moved a million cubic feet of Neville's dump made in 1893 and found many valuable remains of sculpture belonging to Queen Hatshepsut's temple.

Giza.—The alabaster sarcophagus found by Reisner in the tomb of

Queen Hetep-Heres I was a disappointment. It was empty. A canopic chest, however, was found which contained her viscera. A toilet box, jars, implements of copper and gold, etc., are among the many things found. They have gone to the Cairo Museum.

Kom Aushim.—A fine wall painting and a number of Greek and Latin papyri of the second century A. D. have been found at ancient Karanis in the Fayum.

PALESTINE

Bethel.—Albright of the American School has proved that modern Beitin occupies the site of ancient Bethel.

Ain Shems.—The Haverford College expedition under Clarence Fisher has nearly cleared the cap of the hill. On a lower terrace a series of tombs was found. The type of burial will, when published, settle what is meant in the New Testament by "rolling the stone away from the door of the tomb."

Beth-pelet.—Petrie in trying to establish a scale of early European history has found five tombs of Philistine rulers with interments that are dated by names of Egyptian Kings as being 1320-1100 B.C. He has also found over one hundred scarabs in excavating twenty graves.

Jerash.—The Yale University and British School joint expedition under A. H. M. Jones has worked exclusively on ecclesiastical buildings of the fourth to the sixth century A. D.

Mount Carmel.—In a cave on the slope of the mountain implements of bone and flint and the shoulder-blade of some animal are comparable with similar ones among Upper Paleolithic remains of western Europe.

The Serabit Inscriptions. — The "alphabetic" characters, thirty-eight as against twenty-two in the Phoenician alphabet, claimed by Lake and Blake as independent—from Egyptian—creations from Semitic names of objects, and dated earlier than 1500 B. C., are recognized by both Butin and A. H. Gardiner, but both doubt the decipherment.

Tell Beit Mirsim (Kirjath Sepher).—The joint excavation of the American School in Jerusalem and Xenia Seminary under Albright has identified five strata of occupation. The top, fifth city, was built about 900 B. C. and destroyed, probably, by Nebuchadrezzar in 586 B. C. Iron and "Philistine" pottery were found here. The pottery of the fourth stratum is 14th and 13th century B. C. That city was destroyed by the invading Israelites. The third city stratum shows that it was built in the seventeenth and destroyed in the sixteenth century B. C. The second is eighteenth and seventeenth centuries B. C., and has pear-shaped polished jugs like those in Egypt of the Hyksos period. The first city, lowest level, is twenty-first century B. C., and its stratum contains typical pottery of the Early Bronze period.

Et-Tell (Ai).—The American School has proved that Ai was abandoned in the late bronze age and was never reoccupied.

Mt. Ephraim.—Miss Dorothy Garrod under the British School of Archaeology found in the lowest strata on Mt. Ephraim bones and implements of the same race as the man of the Galilee skull, thus bridging the gap between Abraham of about 2000 B. C. and the Neandertal race of perhaps 20,000 B. C.

Beisan.—Alan Rowe, director of the University of Pennsylvania's expedition, in clearing a temple of Mekal in the Canaanitish city, discovered a brick-covered altar, rising in a series of steps, sixteen by twelve feet in size. An altar of sacrifice was also found, but it is of stone. The circular oven for roasting the sacrificial animals was found hard by, also many bronze weapons, chain links, scarabs, and cylinder seals.

MESOPOTAMIA

Shechem.—The entire acropolis has been laid bare by the German Oriental Society. The remains belong to two periods, the middle bronze and the late bronze ages.

Ur of the Chaldees.—C. Leonard Woolley announces the discovery of harps, one so carefully excavated that a photograph showed the white lines, against the soil, of the rotted gut of ten harp strings. A fluted tumbler of gold, the head of a bearded bull in gold and two statues of rams of gold, lapis, shell, and silver are the best of the finds.

Kirkuk (Iraq).—The joint expedition of the Baghdad School and Harvard University closed its second season about April first. More than seven hundred tablets of economic character, belonging to the sixteenth century B. C., were found.

TURKEY

Constantinople.—The British Academy working in and near the Hippodrome have found the underground water supply pipes, the gymnasium, the market place, two statues, one inscribed with the name of Hecuba, the other with that of Aeschines. They found also a triumphal arch in the Forum of Theodosius, which is dated in the time of Arcadius and Honorius.

HUNGARY AND GERMANY

Pusztaistvanhaza.—Further discoveries in an early copper age cemetery have been: two vases incrusted with mother of pearl, a skeleton of a female containing more than one thousand pearls, and knives in positions that seem to prove that men of the period wore belts.

Centenary.—The hundredth anniversary of the foundation of the German Archaeological Institute was held in Berlin in April. Director Rhys Carpenter, of the American School at Athens, represented the Archaeological Institute of America.

GREECE

Cyprus.—The Swedish expedition has excavated the sites of Vouni and Dali. The square stone blocks of the palace at Vouni are particularly impressive, and remind one of Minoan palace walls. Two temples have also been found.

Corinth.—T. Leslie Shear found a marble statue of a young athlete, a good Roman copy of a Polyclitan bronze original.

Dendra.—Three fine chamber tombs containing costly funerary furnishings of bronze vessels, gold and bead ornaments, and a sacrificial table, dating about 1300 B. C., have been found by the Swedish expedition.

Artemision.—Finds pulled up from the sea off Artemision are, a bronze Zeus, and a bronze boy jockey. They are Hellenistic in date.

ITALY

Herculaneum. — The woodwork dividing *atrium* from *tablinum* is so good that a newly-excavated house has been called the "House of the Charred Partition." Well preserved wooden furniture and a stairway have also been recovered.

Rome.—The Forum of Augustus and part of the Forum of Trajan are now opened to the public. A bazaar has been found in the Forum of Trajan. Four splendid temples, one of them a round one of republican date, have been discovered across the street from the Argentina theatre, in the Largo Argentina, near the Porticus of Pompey. The formation, under Count Comm. Costantini, of the International Mediterranean Research Association of Rome, is an event of tremendous significance in the archæological world. An American committee is under formation.

Nemi.—One of Caligula's barges is now entirely out of water. The deck of this barge was made of layers of plank, brick, cement, and marble. The wooden hull has some of its lead sheathing. The barge was built on the watertight compartment plan.

ENGLAND AND FRANCE

Cærleon.—The date of the Roman fortress has been established as 75 A. D. It had four gates, an elaborate system of look-out turrets, and a metalled road three feet thick skirting the base of the ramparts.

Newcastle.—The junction of the Roman wall with the fort at Wallsend has been investigated and correctly mapped. The long-looked for *Pons Ælii* has also been discovered.

Presles. — A dolmen has been opened. It has a paved floor and wall reliefs. In the vestibule, filled up in the Neolithic period, were found stone and bone tools, broken vases, and the bones of fourteen animals. In the chamber were the remains of the skeletons of one hundred persons of all ages and both sexes.

PAINTING

By Frances M. Henderson

American Federation of Arts

GENERAL ADVANCEMENT IN ART ACTIVITY

In the realm of the arts 1929 has been marked less by notable creative achievement than by a general concerted activity on the part of organizations and individuals throughout the country for the advancement of knowledge and appreciation. This included establishment of art galleries and collections, enlargement and enrichment of galleries long maintained, encouragement of art activities in schools and colleges, and in rural districts remote from large centers, surveys for the purpose of determining best methods of teaching the arts, and similar undertakings too numerous to mention. There is evidence on all sides of increasing consciousness of the place of art in life, the kind of appreciation and understanding which augurs well for the future of art and for its progress in this country.

MURAL PAINTING

Arthur Covey.—Nevertheless each year brings creative development. In the field of mural painting especially, new themes are portrayed, new methods employed. Among the notable works completed this year are a series of mural paintings by Arthur Covey in Norton Hall, Administration Building of the Norton Manufacturing Company of Worcester, Mass. These paintings, of which there are ten, illustrate some of the more striking processes which engage the attention of the employees of this company in the manufacture of grinding wheels and machines, and were designed "to bring to the senses of the workman the nobility of his task, and to express, through the high appeal of art, the spirit of the organization which recognizes primarily the human element in the development and maintenance of the enterprise."

Symbolical and Allegorical Murals.—Jules Guerin, among the most distinguished of American mural painters, completed a series of seven mural paintings, allegorical in theme, for the Cleveland Terminal. In the new *Chicago Daily News* Building, Chicago, murals by John W. Norton, symbolic of the dissemination of news, were installed. A series of mural paintings by R. Sloan Bredin are a feature of the new State Museum of New Jersey at Trenton, which was formally opened Oct. 28th. Four exceptionally interesting murals by Alson Clark, a California painter, were completed for the First National Bank of Pasadena. These depict typical California scenes—"The Shipping Industry in the Harbor of San Pedro," "The Orchards," etc. Three mural panels by Bert G. Phillips were given placement in the Missouri State Capitol Building at Jefferson City.

The Coale Murals in New York.—A series of paintings by Griffith Bailey Coale, representing a "Pageantry of the History of Commerce by Sea" were placed on the walls of the Banking Room of the new building constructed by Lee Higginson and Company in New York. The process employed for the execution of these paintings was novel and interesting. The artist first made charcoal drawings on canvas of the pageant, comprising 36 types of ships from the dawn of history to the present time. These were photographed before being painted, and from these photographs stereopticon slides were made. Through the medium of these slides the drawings were enlarged, the outlines traced on huge pieces of paper which were perforated when the drawings were completed. These sheets placed on the canvas-covered walls of the unfinished building, served as transfer sheets. Twelve union painters were called in, not to coöperate but to execute the technical part of laying on color. This was made possible by the numbering, by the artist, of each portion of the design with numbers calling for one of the twenty-two colors or shades of paint to be used. Mr. Coale also completed two mural panels for the New York Athletic Club.

Jewish History Frieze.—A frieze depicting episodes in Jewish history was completed by Hugo Ballin for Temple B'nai B'rith, Los Angeles. The work is 320 feet long by 7 feet high, with three lunettes of imposing proportions. It is the gift of the Warner Brothers.

"Old New York" Murals. — A charming series of mural paintings of "Old New York" were designed and executed by Joe and June Platt for the dining room of a private residence in New York. Among the scenes represented are views of the "Old Custom House, Broadway"; "Government House Built for Washington"; "Tontini's Coffee House and Old City Hall"; "Fulton Street Market and Castle Garden."

Miscellaneous.—Ives Gammell completed a mural painting entitled "The Fountain of Knowledge" for the Newark (N. J.) Free Public Library. A mural designed by Theodore Roszak and executed by him, in coöperation with members of the Graduate Atelier of the School of the Art Institute of Chicago, was installed in the new studio theater at the Art Institute. Maynard Dixon completed a painting, "The Legend of Earth and Sun," for the Arizona Biltmore Hotel, Phoenix, the first of a series of murals which he has been commissioned to execute for the hotel. A mural in two panels, entitled "He Hath Sent Me to Heal," by William De Leftwich Dodge, was installed in the Virginia Baptist Hospital, Lynchburg. An altarpiece by Andre Derain, well known French painter, in theme representing "The Last Supper," was placed in the Chapel of St. Francis of Assisi at Wheeling, Ill. Wall and ceiling panels for the new club house of the Scarab Club of Detroit were executed by Reginald O. Bennet, Conrad Lubneau, Philip A. Sawyer and Sidney Walton. Bertha Lum, an American artist who is best known for her block prints of Oriental subjects, executed a painting of a Madonna, for the chapel of the archbishop's house in Peking, China—an interesting commission.

EXHIBITIONS AND PRIZE AWARDS

Carnegie Institute, Pittsburgh.—Representative exhibitions of American painting were held at the Carnegie Institute, Pittsburgh (the 28th Annual International Exhibition of Paintings), the Art Institute of Chicago and the Pennsylvania Academy of the Fine Arts, Philadelphia. If, as some believe, prizes are stimulating to production, much is to be expected from these annual showings, the first two of which include increasingly generous cash awards. In connection with the 28th International Exhibition of the Carnegie Institute, Pittsburgh, which opened Oct. 17th and continued to Dec. 9th, there was offered, in addition to the usual Carnegie prizes and that of the Garden Club of Allegheny County, the Albert C. Lehman Prize of $2,000 for the best painting in the exhibition available for purchase. This award went to Felice Carena of Italy for "The Studio," to which was also awarded the first Carnegie Prize of $1,500. Three American painters were among those to whom awards were made:—William J. Glackens of New York City receiving the second prize of $1,000 for his "Bathers, Ile Adam"; Edward Bruce, who has in recent years lived and painted abroad, First Honorable Mention and $300 for "The Pear Tree"; and Joseph Pollet of New York Honorable Mention for his "Autobiography." The exhibition included 392 paintings, of which 256 were by European and 136 by American artists. In all, 124 artists,—64 European and 60 American—were represented. The American Committee of Selection was composed of Maurice Sterne, Leon Kroll, Charles Hopkinson, Guy Pene Du Bois and Felicie Waldo Howell. The Jury of award comprised Wladyslaw Jarocki of Poland, Andre Dunoyer de Segonzac of France, Vivian Forbes of England, and Maurice Sterne, Leon Kroll and Charles Hopkinson of the United States. Homer Saint-Gaudens, Director of Fine Arts at the Carnegie Institute, served as Chairman of this jury.

Art Institute of Chicago.—In connection with the 42nd Annual Exhibition of the Art Institute of Chicago, set forth from Oct. 24th to Dec. 8th, no less than ten cash prizes were awarded, amounting in value to over $7,000. Among the painters so honored were Alexander Brook, Evelyn Van Norman, Arnold Blanch, Eugene Higgins, Henry Lee McFee, Davenport Griffin, Tunis Ponsen and Paul Trebilcock.

Virginia House, Richmond. — Among the collections of paintings of unique interest set forth during the year was that of Historical Portraits assembled at Virginia House, Richmond, Va. during May and June. This included portraits of Pochahontas, of James I, of President William Henry Harrison, John Randolph of Roanoke, and others whose names are linked with the early history of Virginia, principally by early American portrait painters. Virginia House is a reconstruction of the ancient Warwick Priory, purchased in England by Alexander B. Weddell and by him rebuilt and presented to the Virginia Historical Society as a museum.

American Indian Art.—Much interest has been manifested of late in the art of the American Indian. Collections of paintings in water color by Kiowa and other Indians of the Southwest were shown during the season at the Museum of Fine Arts, Boston and at the Minneapolis Institute of Arts, as well as in other Eastern art centers.

Individual Exhibitions.—Gari Melchers, Childe Hassam and Edward W. Redfield, leaders among conservative painters in this country, held notable one-man exhibitions, which constituted in each instance a comprehensive review of production, past and present. Mr. Melchers' exhibition was shown at the Anderson Galleries, New York, during January; Mr. Hassam's at the Albright Art Galley, Buffalo in March and early April; and Mr. Redfield's at the Philadelphia Art Club in December.

Loan Exhibition of Flemish Primitives.—Eloquent testimony to the wealth of American private collections was borne by the Loan Exhibition of Flemish Primitives set forth at the Kleinberger Galleries, New York, during October and November for the benefit of the Free Milk Fund for Babies. The collection was composed in large part of loans from individual collectors and included works by Pieter Brughel the Elder, Hans Memling, Dirk Bouts, Petrus Christus and many other equally famous masters of the past, a truly notable assemblage.

COMPETITIONS AND FELLOWSHIPS

The Texas Wild Flower Painting Competitions, established three years ago by Edgar B. Davis of Luling, Texas, and New York, and still conducted annually, are interesting. In 1926 two prizes of $5,000 and $1,000 respectively, were offered by Mr. Davis for the best paintings of Texas wild flowers by American artists. In 1929, 31 prizes were offered, totalling in value $31,500. The major award of $3,000 was won by E. Martin Hennings of Chicago for a picture "Thistle Blossoms."

Fellowship of American Academy in Rome.—As a result of the annual competition for Fellowships of the American Academy in Rome, John M. Sitton, a student of the Yale School of Fine Arts, was awarded the Fellowship in Painting, entailing three years' study at the Academy, with an annual stipend covering living and travel expenses. This is the fifth consecutive year in which this award has been received by a student of the Yale School.

Medal Awards.—The Gold Medal in painting of the Architectural League of New York was awarded this year to Eugene Savage, for his decorations for the Elks's Memorial in Chicago. The American Institute of Architects awarded its medal for achievement in fine arts to Diego Rivera, mural painter of Mexico, whose work has lately been brought to attention through reproduction in American periodicals.

GALLERIES AND MUSEUMS

Modern Art in New York and Atlantic City.—Two new galleries for the display of the so-called Modern Art have been established this year—the Museum of Modern Art in the Heckscher Building, New York, and the Municipal Art Gallery sponsored by the Atlantic City Art Association, centrally located on the Boardwalk. The Museum of Modern Art, which is reported to be an "American Luxembourg," was formally opened in October with an exhibition of paintings and drawings by leading representatives of the Modernist movement in France,—Cezanne, Van Gogh, Gauguin, Renoir and Seurat. The Atlantic City Art Gallery showed continuously throughout the summer months an exhibition of works by the more extreme exponents of the Modern school in this country, with a few works of the more conservative painters to maintain a balance.

Baltimore Museum of Art.—Among the established museums attaining milestones in progress through the dedication of new buildings was the Baltimore Museum of Art, which opened April 18th its new home adjacent to Wyman Park, on ground given by Johns Hopkins University.

The Roerich Museum, New York, also dedicated on Oct. 17th its new building at 310 Riverside Drive. This museum is particularly notable for the series of 76 Tibetan banner paintings by Nicholas Roerich, founder of the institution, as well as for other rare collections of Asiatic art.

GIFTS AND BEQUESTS

Havemeyer Bequest.—Gifts and bequests of more than usual munificence were received by art museums and associations, as well as by universities and other educational institutions. The Metropolitan Museum of Art, New York, received through the will of the late Mrs. Henry O. Havemeyer a great and almost invaluable collection of paintings, numbering approximately 200 works by masters of the early Italian, Dutch and Spanish schools and of the later French schools up to the present time.

Money Gifts.—The University of Chicago received a gift of $1,000,000 from Max Epstein, art patron and philanthropist, for the establishment of an art center at the University. A gift of a similar amount was presented to the California Palace of the Legion of Honor, San Francisco, by Mr. and Mrs. Henry K. S. Williams to establish a fund for the maintenance and upbuilding of an important art collection, the nucleus of which was also given by them.

Gellatly Gift to National Gallery.—An art collection, valued at several million dollars, was presented to the National Gallery of Art at Washington by John Gellatly of New York. This collection is especially rich in works by American artists.

Goethals Art Memorial.—A series of 17 paintings of the Panama Canal under construction, made in 1913 by Jonas Lie, was purchased for $50,000 and presented by an anonymous donor to West Point Military Academy as a memorial to General Goethals.

OBITUARY

The world of art suffered serious loss in the death of Robert Henri, one of the foremost American painters, which occurred in New York on July 12th, 1929.

SCULPTURE

By Ralph Flint

Art Critic, New York

GENERAL OBSERVATIONS

Sculpture, lacking the easy marketing and spontaneous publicizing of the other arts, comes into its own by slow degrees. It appears before the public each season in smaller quantities on the average than it should. Only when some large group exhibition is arranged, as in the case of the National Sculpture Society's show in San Francisco last summer, does sculpture enjoy the ready audience that assists at demonstrations of art in the departments of painting, theater, music, cinema, etc. Out of the long periods of study, meditation, preparation, and actual execution, does sculpture grow into full fruition; out of costly materials, too, does the average sculptured form appear, another consideration that tends to check the ready flow of production. Ways and means, then, to the sculpturing fraternity, have to be taken more seriously than in the other arts; and so, to these practitioners of the plastic arts, delving into the waiting stone and metal and square-hewn trunk, a greater appreciation and patronage should be forthcoming to help them on their way.

GALLERIES AND EXHIBITIONS

Fifty-sixth Street Galleries.—In evidence of such an increased interest is the newly opened sculpture center in New York City, known as the Fifty-sixth Street Galleries, operating under the joint auspices of the Gorham Bronze and Roman Bronze Companies. Riccardo Bertelli is director and Mrs. Kolhman Magee is in charge of the exhibitions. Here is a definitely planned clearing house for sculpture of all sorts equipped for one-man shows and general group exhibitions as well. The range of important men and women to be seen here at all times is imposing. Gleb Derujinsky and Lucy Perkins Ripley have individual shows for the opening sessions, with Mr. Derujinsky's wood carvings standing out prominently by virtue of their combined delicacy of handling and grace of conception. This artist, who was also seen in a one-man show at the Grand Central Galleries, grows in power with the years, his "Adam and Eve" in pear-wood being an exceptional achievement. A more rugged "Pieta," also in wood, is a brilliant accomplishment. Mrs. Ripley supplements her exhibition of sculpture with a series of animated figure drawings which argue a new lease of life to her art. Several heads by Arnold Geisbuhler, whose wife, Elizabeth Chase is also represented by a splendidly executed bronze portrait head, are at hand, and show this young Swiss-American sculptor to be one of the most promising of the younger men. His exhibition earlier in the season at the Kraushaar Galleries was an event of prime importance, his series of Oriental portrait heads proclaiming him a close student of human nature as well as a gifted modeler. Important men to be represented at these new galleries are Gaston La-Chaise, Jacob Epstein, whose recently unveiled colossal figure of "Night" in London has apparently aroused as great a storm of disapproval as his much maligned Hudson Memorial; Paul Manship and Jo Davidson, among others.

San Francisco Exhibition.—The National Sculpture Society of New York's assemblage of more than twelve hundred pieces of contemporary work for the San Francisco exhibition proved a colossal undertaking, but so successfully were the various details worked out that the efforts were fully justified. More than three hundred sculptors were represented, including such well known figures as Daniel Chester French, who had a special gallery reserved for his work; Lorado Taft, Harriet Frishmuth, Malvina Hoffman, Anna Hyatt Huntington, Chester Beach, Edward McCartan, Jacob Epstein, and Jo Davidson. Archer M. Huntington's "surprise gift" of $100,000 made possible this stupendous aggregation of plastic art, and all the rooms of the California Palace of the Legion of Honor in Lincoln Park, together with extensive reaches of lawn and sixteen outdoor "galleries" were utilized to hold the exhibition. Under the direction of Cornelia B. Sage Quinton the items were ranged to their best advantage, with a plentiful addition of outdoor planting to enhance the effect, alleys of rhododendrons being handsomely employed.

New York Society of Women Artists held its annual exhibition at the Anderson Galleries (now consolidated with the American Art Galleries) at which Concetta Scaravaglione's "Bather" was an outstanding piece. Sonia Gordon Brown and Minna Harkam were also well represented.

Spring Academy.—The only sculpture award (Ellen P. Speyer Memorial Prize) went to Furio Piccirilli for his extremely handsome "Black Seal." The American-Belgian sculptor Helen Sardeau was introduced at the Ferargil Gallery, Frank Crowninshield, well known connoisseur and collector, supplying the catalogue with a foreword of appreciation. Her masks were well received.

Downtown Gallery.—Duncan Ferguson exhibited at the Downtown Gallery to distinct advantage, his small-scale heads and stylized animals showing forth his versatility. For contrast a large male nude "Man" (lent by the Newark Museum) stood dominantly in the center of the gallery, displaying unusual strength and maturity for a young artist.

American Dealers Association, admitting foreign works to its exhibition for the first time, held the annual show at the Anderson Gallery, with works by LaChaise and Bourdelle dominating the department of sculpture.

INDIVIDUAL EXHIBITS AND AWARDS

Korbel.—One of the most elaborately worked out one-man shows of the year was Mario Korbel's demonstration at the Jacques Seligmann Galleries where more than fifty works in bronze and marble filled the entire lower floor of this commodious establishment. From his large marble figure, "The Kiss," to his smallest bronzes, he proves himself a craftsman of highest order; his marbles, his highly polished and smoothly surfaced, have a decidedly mortuary effect, however. In his bronzes he achieves happier surfacings. Among his many portraits were those of Dr. Arnold Genthe, John McCormack, and Miss Gloria Caruso. A large bronze "Andante" (a duplicate of those in the Metropolitan Museum and the Cleveland Museum) and "Night" (a duplicate of which is in the Chicago Art Institute) were outstanding items in the Korbel exhibition.

The Independents, holding their exhibition on the roof of the Waldorf-Astoria for the last time, produced little of interest in the sculptural line. One figure of merit that stood out among the many strange entries in this free-for-all encounter was Norman J. Mortimer's portrait head of Harry W. Bell, a frankly realistic portrait but containing a large element of style in the handling of the subject.

The Salons of America, run in the same way as the Independents, were unable to bring forth any notable sculpture, but at least they offer each year an opportunity for unknown artists to gain a metropolitan hearing.

Elierhusen and Amater Awards.—The annual exhibition of the Architectural League was held as usual in the commodious Grand Central Palace, filling four floors with varied proofs of artistic fervor and activity. Ulric H. Elierhusen of New York received the Gold Medal for sculpture for his work for the University of Chicago chapel and at Christ Church at Cranbook Foundation near Detroit. The Avery Prize for small sculpture went to Edmond R. Amater for his "Summer."

Grand Central Gallery Prizes.—The Grand Central Art Galleries' second annual prize exhibition brought forth the following awards for sculpture: Irving T. Bush Prize to Attilio Piccirilli for his "Uan Fancialla," the William Goodman Prize to Mario Korbel for his "Sonata," and the John E. Jenkins Prize to Max Kalish. At the annual Houston exhibition of painting and sculpture arranged by these enterprising galleries, more than one hundred examples of contemporary American sculpture was displayed, out of which were many sales, including Harriet Frishmuth's "Crest of the Wave" and "Roses of Yesterday" and Anna Hyatt Huntington's "Lioness and Cub."

Detroit and Boston.—The Exhibition of Michigan Artists at Detroit brought forth a representative showing, with Samuel Cashway, Winifred M. Grindley, and Horace Colby winning the prizes. The Boston Society of Sculptors showed at the Boston Arts Club, with Hugh Cairns, Cyrus Dallin, Philip Saers, Richard Recchia. Ellen Debney, Enid Yandell, and Leonard Craske among the many exhibitors.

New York.—Among the New York exhibitions were showings by Crazio Mandarelli and James D. Herbert (both at the G.R.D. Gallery), Hunt Diederich (Sterner Gallery), J. B. Flannagan (of the Whitney Club group, with sculpture showing influence of primitive Negro and Mexican art), Roy Sheldon, Maultaszche (of the Dudensing group), Heinz Warneke (at Milch's with a splendid showing of works in stone and bronze and wood), Nishan Tor (Armenian-American sculptor), and Albert Stewart (effective animal sculptor at the Arden Gallery).

Washington.—A bronze head of Ramsey MacDonald by Jacob Epstein has been presented to the Corcoran Galleries in Washington by Stevenson Scott, well known New York art dealer.

Miscellaneous.—The annual soap sculpture contest, organized by the Procter and Gamble interests brought out the amazing total of three thousand or more entries, doubtless owing to the grand total of $1675 in prizes. Gutzon Borglum and Lorado Taft lent distinction to the jury of awards and the first prize in the professional class went to Bertha J. Hansen of Rutherford, N. J. The winner of the annual Prix de Rome sculpture award for 1929 was Sidney B. Waugh, of Amherst, Massachusetts, a pupil of Bourdelle. This award was made from a field of ten competitors and the submitted work was placed on exhibition at the Grand Central Galleries. The annual Garden Sculpture show at the Milch Galleries, with Edith Carsons, Mario Korbel, Janet Scudder, Heinz Warneke, Orazio Maldarelli, Alexander Archipenke, Bessie Potter Vennoh, Louise Wilder, and Mary E. Moore were among others contributing. The only prize awarded at the Winter Session of the National Academy of Design was the Helen Foster Barnett Prize, which went to Michel Fields. Fewer artists of note than usual participated in this classic event, leaving the field of painting to capture most of the interest. Allen Clark, maker of colorful images of the Orient and elsewhere, held an exhibition at San Francisco.

SCULPTURAL ACTIVITIES

Among the year's sculptural activities may be listed a partial selection, as follows: two busts by Jo Davidson, of Clarence Darrow and Gabriel Wells; a Memorial to All Wars by Leonard Craske, at Amesbury, Mass.; figures by Harriet Frismuth erected in Windsorville, Conn., for the Norton Memorial, and in Denver, Col., for the Mullen Memorial; twelve metopes and pediment sculpture for the Buffalo Historical Society by Edmond Amateis; a heroic bronze figure of B. F. Jones for the Jones Memorial Library at Aliquippa, Pa., by Robert Aitken, as well as a bust of Henry Clay installed at the Hall of Fame in New York; sculpture for the Bok Carillon Tower, Lake Wales, Florida, by Lee Laurie, for the Bertram L. Goodhue Tomb (with recumbent figure) for the chapel of the University of Chicago, Ill., and ecclesiastical sculpture for the Church of the Heavenly Rest, the Cathedral of St. John the Divine, and St. Mary The Virgin, all in New York; sculptural decorations for the Huntington Mausoleum in Los Angeles by John Gregory; a bust of Commander R. E. Byrd by Margaret Cresson French installed at the Corcoran gallery of Art in Washington, as well as a bust of George Grenville Merrill which received the Crowninshield Prize at the annual Stockbridge (Mass.) Art Exhibition; a bust of Emma Willard by Frances Grimes installed at the Hall of Fame, New York; F. W. Ruckstull's statue of Wade Hapton for the Statuary Hall in Washington, D. C.; an equestrian statue by A. Phimister Proctor for the Taylor Memorial Park in Pendleton, Oregon; Henry Hering's Indiana State War Memorial at Indianapolis, as well as the pediment sculpture for the new Chicago Civic Opera and spandrills for the Yale Art Museum; busts and decorative panels by Anna Coleman Ladd; ecclesiastical sculpture for the Cathedral of St. John the Divine, New York, St. Patrick's Cathedral (New York) and St. Paul's Cathedral, St. Paul, by A. H. Atkins; Albin Polsek's marble group for St. Paul's Cathedral, St. Paul, and a large bronze

"Pilgrim" for the Bohemian National Cemetery in Chicago; two figures of "Sun" and "Earth" by Chester Beach for the Court of Nature in front of the Cleveland Museum of Art, and a memorial to Dr. Holt for the new Babies' Hospital of the New York Medical Center; Victor S. Holm's memorials in St. Louis and Granite City, Ill., as well as allegorical decorations for the Masonic Temple at St. Louis; Brenda Putnam's memorial figures erected in Colorado Springs, Col., and Fairfield, Conn.; and various works by Cyrus Dallin, Erwin F. Frey, Albert Lucas, Ricchard Recchia, Bruce Wilder Saville, C. P. Dietsch, Frank Jirouch, Eleanor M. Mellon, Jo Mora, Haig Patigian, Karl H. Gruppe, Lawrence T. Stevens, Beatrice Fenton, Grace M. Jonson, and E. Angela.

ARCHITECTURE

By Harry Francis Cunningham

Architect, New York

GENERAL

American architecture in general is showing a very slight improvement in the quality of the design. A few of the architects who have been feeling their way, as it were, have begun to see the light. A great many, of course, are still groping blindly about in the easier pathway of plagiarism of one sort or another, but there are a few who are really doing things that have in them the suggestion of genius. These men are more numerous than they were a year ago and the prospect for American architecture is brighter than it has been for some years. The wild scramble for what might be called an "Architecture of Escape" which began on the calendar coincidently with the passage of various laws intended supposedly to be beneficial to society in some ways, is wearing itself out. A great many freak buildings are still being built, of course. The great American urge to be bigger and bolder than one's neighbor is still manifesting itself, particularly in New York. There is still, in some quarters, a remnant of the old belief in the advertising value of the tallest building. But the limit of possibility would seem to have been just about reached and many buildings have now become so tall that there is little distinction to be had any more from mere tallness. This, of course, is a good thing and holds a promise of better things in the future.

BUILDINGS

Chicago is beginning to show a great advance in the number of its buildings that take their places in the front rank of worthwhile efforts. The new *Daily News* building, by Holabird and Root, is a particularly distinguished effort. The murals in that building by John Norton are among the finest in the country. At the present writing a notable competition for a war memorial in Chicago is about to be judged. The writer enjoyed the privilege of seeing one of the invited designs for this competition and even if the other designs are perfectly mediocre Chicago is certain to have a memorial without a peer if the judges are up to the high intellectual and imaginative level that their responsibility should require.

New York Churches.—The Heavenly Rest Church in New York, which has already been noted in these columns, has this year acquired its reredos. This marvelous bit of design by Hardie Phillip of the Goodhue Associates is one of the most original as well as one of the most beautiful bits of design that this country has produced. In the interior of the new Synagogue in New York, by Kohn, Butler and Stein, color has been used freely, boldly and well. It is unfortunate that much of the exterior detail of this building (which otherwise has so much to entitle it to great distinction) should be so commonplace.

The Master Building.—The new Master building at Riverside Drive and 103rd Street in New York, by Harvey Corbett and his associates is an exceptionally distinguished bit of really modern design—modern architecture that is reasonable and appropriate. In this building the brick has been graduated in tone as the stories pile up, from dark at the bottom to light at the top. This stunt which was tried out against much opposition, but with some success, in a town in Florida some years ago by the writer of this review, is particularly successful in the Master building and should have a great influence on the brickwork of America's future buildings.

New Telegraph Building. — The new Telegraph Building in lower New York, by Ralph T. Walker of Voorhees, Gmelin and Walker, is quite the finest thing in the New York skyline. This building is entirely of brick—brick of the color of the sunset—and the material is used with perfect skill. It is well worth the pains of a trip to the Brooklyn Bridge to be able to look back on the medley of mediocrity that is lower New York and see this bright vision of Mr. Walker's—an object lesson to New York.

The Stewart building on Fifth Avenue and 56th Street, which was designed in the office of Whitney Warren is very fine, excepting for the doorway, which is filled with a variety of materials all of the wrong colors and much too close to the plane of the front of the building. The store building problem has found a new solution in this fine building, and the manner in which an appearance of great strength has been given to the piers between the show windows at the sidewalk level is particularly noteworthy.

Other New York Buildings.—The Chrysler building in New York, which one believes is the tallest to date (if one includes all the "onions" and the flagpole) is not, of course, architecture. It is the latest effort to be tall and it is the latest effort to be different. It can have no other claims to distinction unless it be that it has gone higher more quickly than any other building so far. The great band of terra-cotta fruit and flowers about the Chanin Building in New York is an outstanding example (because it is big and a very faithful copy) of the recent influence of modern French ironwork upon recent American architectural detail.

ARCHITECTURAL EDUCATION

Most of the educational institutions that have come under this reviewer's notice have given up the normal function of the Architectural School (that normal function being to provide a proper background) and are now earnestly devoting their efforts to the development of clever draftsmen well versed in the "French Ironwork" style and none other. It is particularly sad to reflect that at the very moment that American architecture appears to be making very definite improvement, the schools where some of America's future architects should be in the making, are simply passing from the old habit of plagiarising respectable backgrounds to the more dangerous and much less healthy experiment of copying inappropriate and exotic "foregrounds." The architectural student in most of our schools is learning to draw and he is learning to paint (after a fashion the soundness of which is questionable), but he could learn both at much less cost in a good office. He is not learning the canons of good taste, and those are the very things the school should be giving him. The only schools, so far as one knows, where the student is being still given the sort of preparation the future architect should be given, are those of Oregon (under Willcox) and Florida (under Weaver).

BIBLIOGRAPHY

A new book of illustrations by Hugh Ferris, entitled *Metropolis of Tomorrow*, is extremely interesting. The architectural book market is glutted with countless works illustrating the "French Ironwork School," the "German Mathematical School," and all the other foreign "Schools" of design that are uniformly inappropriate for our uses and out of key with our taste. That wise and capable critic, Lewis Mumford, is writing for the magazine *Architecture*, edited by Henry Saylor and published by Scribners. That fact distinguishes this magazine in the field of architectural magazines, a field that is otherwise noteworthy for its utter lack of distinction or interest. The one-time *Journal of the American Institute of Architects*, which reached such notable heights of idealism under the capable and sympathetic editorship of Charles Harris Whitaker, has been discontinued by the singularly unsympathetic directors of the Institute who have made of that one-time idealistic body a mere "Architectural Chamber of Commerce" with an altogether appropriate house organ. Thus does materialism tend to stifle art and the literature of art.

MUSIC AND THE OPERA

By Catherine Smith Bailey

Music Critic, *Christian Science Monitor*

INFLUENCE OF RADIO ON MUSIC

Decline of the Recital.—More and more plainly, with each year, the radio leaves its marks on the musical activities of all America. A few years ago soloists' recitals, orchestral concerts, and performances of opera were the principal fare of audiences. Now the first of these three has almost vanished from the scene. No longer do people flock to hear singers, pianists, and violinists. Only the outstanding figures of the day can summon large groups of listeners. Beginners still venture public recitals, but the number and the significance of these functions is diminishing. The radio now offers the most promising avenue of approach to the public, and the audience which judges a young musician's prowess is a numberless and invisible one which turns a dial one way or the other for approval or disapproval, and later indicates these feelings in "fan" letters. The better of the young performers and composers are gradually being absorbed into the well organized radio broadcasting studios and into the large corporations which now control the radio market.

Public Attitude to the Concert.—A calendar of the musical year mirrors this situation clearly. A few outstanding performers still give concerts to which people throng. Kreisler, Heifetz, Hayes, and others of similar caliber have not felt the inroads of the radio. These are artists of established reputation. But the new favorites are in large measure singers and players who have reached their listeners from broadcasting studios. In a few cities, such as New York, Chicago and Boston, the smaller concerts still survive in considerable numbers, just as do legitimate stage performances of better plays. But the "road," in the old sense of the word among musicians and actors, is almost as extinct as the dodo. Only in the programs of Women's Clubs may performers find a ready place. But these audiences have grown far more critical than they were before; a small instrument in their own living rooms brought them the cream of the musical crop each season.

Broadcasting Limitations in Symphony and Opera.—Yet there are two branches of music performance which the radio can not injure. They are concerts by symphony orchestras and operatic performances. Neither of these gain in transmission over the radio. Both lose immensely in impressiveness and in forcefulness. By radio transmission, a symphony concert is a pallid affair. The colorings and the vivid timbres of the instruments, the delicate phrasings are lost in transmission. It is impossible to postpone an appearance of a large body of players as easily as it is that of a single performer, if atmospheric conditions are unfavorable. Therefore, those who wish to enjoy music by orchestras in full measure must still go to the concert hall and hear not a reproduction of a performance but the performance itself, with all its impact and appeal. Even less feasible than the broadcasting of symphony concerts is that of operas. True, one may hear the soloists and the chorus and the orchestral accompaniment. Between acts, one may furthermore enjoy the doubtful pleasure of listening to an announcer outline the story of the opera. But the color, the vivacity, the dramatic substance of the actual performance are entirely obscured. Since broadcastings are usually made from actual performances on a stage intended for visual as well as aural enjoyment, the microphone almost never catches the music in its true stature and in its actual dramatic intensity. As for the costumes, the gestures, and all the visual pageant and panoply which heighten the attractiveness of this genre, they simply do not exist for the radio listener.

THE OPERA

"Boris Godunoff."—Philadelphia housed what is probably the outstanding musical event of the year when Leopold Stokowski led the Philadelphia Orchestra, the Mendelssohn Club of Philadelphia and a group of soloists through the first performance in this country of the initial version of Mussorgsky's "Boris Godunoff," undecorated by Rimsky-Korsakoff's orchestral additions and variations. For some years "Boris," in the Rimsky-Korsakoff version, has gained currency in America. Chaliapin, in his early days of popularity here, brought it to its first successes. The dramatic power of its story, the shrewd musical delineation of the Tsar and of the other characters, the brilliance and pageantry of many of the scenes, the stark power of the music have all strengthened its hold on the public. This "original" version was first made public in 1928 by the Soviet Government, and its first performance was March 5, 1929, in Moscow at the Stanislawsky Opera. Published by the Oxford University Press in England, it has now become available for performance elsewhere than in Russia. The first and original version by Mussorgsky was added to by himself in order to secure a staging of his opera. This version now labeled "original," which has attracted so much attention, differs principally in the orchestration from the Rimsky-Korsakoff arrangement. Only a few scenes, removed from the opera by Rimsky, have been replaced. Various scenes have been rearranged to their first sequence. The most notable addition is the scene before the Cathedral where the idiot begs Boris to cut the throats of the urchins who have been tormenting him as he cut the throat of the rightful Prince, Dmitri. The scene in the cell of Pimen has also been enriched by the addition of a fine piece of narrative writing. But many of the variations between Mussorgsky's original orchestration and that of his administrator, Rimsky-Korsakoff, are minute and more a matter for scholarly discussion than for observation in the rapid ebb and flow of an actual performance.

"Jonny Spielt Auf."—A few novelties and revivals aroused much comment during the year. Jan. 19, the Metropolitan Opera Company in New York gave Křenék's "Jonny Spielt Auf," a so-called jazz opera, its first American performance. Florence Easton, Mr. Kirchoff, and Mr. Schorr of the company played the leads. Mr. Urban did the sumptuous interiors for this opera which is obviously a European copy of very early and definitely outmoded American jazz. The consensus of opinion of those who heard this music seemed to be that the opera was an interesting experiment, but that the musical substance itself was of doubtful and ephemeral value.

"Fra Gherardo."—April brought again in New York and from the Metropolitan Company, a performance of Pizzetti's "Fra Gherardo," mounted with care and consideration after long and arduous rehearsing. This opera is characteristic of the present period of transition in musico-dramatic writing, with the forward-looking composers attempting experiments in this difficult medium. Pizzetti's work, with its somber, exacting score, its music-speech, its emphasis on the dialogue, and its utter lack of colorful brilliance and "operatic" effects in the ordinary sense of the word, was foredoomed to failure as far as the public was concerned. Yet its performance does credit to the Metropolitan company, to Tulio Serafin, the conductor who prepared its arduous exactions and who was stage director as well, and to Miss Mueller and Mr. Johnson who played the leading parts. For that matter, the entire cast, including the large chorus, worked on this new opera with skill and musicianship, since it demands from all an extraordinary degree of application and of skill.

"Orfeo" and "Apollo e Daphne."—Northampton, Massachusetts, on May 11 was the scene of the first American performances of two old operatic works, Monteverdi's "Orfeo" and Handel's dramatic cantata, "Apollo e Daphne." These were given under the auspices of the music department of Smith College, and both were directed by Prof. Werner Josten of the faculty. Monteverdi's work proved a noteworthy piece of music, and was given with Marie Milliette singing the parts of Eurydice, La Musica and Sylvia, and Charles Kullman for Orfeo. There were two choruses, one a static, or singing, chorus, the other a dancing chorus which expressed the emotions of the personages. This chorus was trained and led by Maria Theresa, a Duncan disciple. For Handel's rather stilted and deliberately artificial piece Mabel Garrison did the Daphne, and Nathan Stewart the Apollo.

Verdi's "Luisa Miller."—Dec. 21, the Metropolitan Opera Company in New York presented a revival of Verdi's early opera, "Luisa Miller," based on Schiller's "Kabale und Liebe." Apparently this opera which bids fair to succeed beyond any of the novelties or revivals of recent years has gone unheard in this country for forty years or more. It has all the qualities which ensure an opera popularity with the public, melody without stint, rousing choruses, and showy music for the leading characters. Rosa Ponselle and Mr. Lauri-Volpi sang in this revival which was conducted by Mr. Serafin.

New Chicago Opera House.—The Chicago Civic Opera Company inaugurated for itself the use of a magnificent new opera house, with offices and studios and rehearsal rooms in addition to a modern auditorium. Perhaps the company and its directors have been so engaged with details of rearrangement that there has been no opportunity for outstanding innovations or revivals.

The summer season at Ravinia Park was a well varied and thoroughly successful series, with Bori, Gall, Rethberg, Martinelli and Mojica among the more important artists engaged. In addition the Chicago Symphony Orchestra under Eric de Lamarter gave a series of symphonic concerts at the Park. Some other cities throughout the country which enjoyed opera during the summer were St. Louis, Detroit, Los Angeles, and New York.

Operettas.—Two significant appearances of operetta came with the revival of Johann Strauss's "Fledermaus," done in English at the Majestic Theater in New York, and Victor Herbert's "Mlle. Modiste" and "Naughty Marietta," both well attended. Herbert's piece is intended to inaugurate an entire series of his operettas.

ORCHESTRAS

American Orchestral Tours in Europe.—The spring of the year saw the announcement with much attendant publicity, of the projected trip by the Boston Symphony Orchestra under Serge Koussevitzky, the regular conductor, to Europe in 1930, after the close of the regular season in the United States. But those plans were unconditionally abandoned when it became clear that Toscanini, who has gradually assumed an almost complete monopoly of the affections of New York orchestral audiences, planned to duplicate such a trip with his Philharmonic-Symphony Society. Thereupon, Dr. Koussevitzky gave up his project, for it was plain that there would be no room for two orchestras on a nearly identical concert route in the same season. Much significance is attached by some of this pilgrimage of American orchestras to Europe. Those who favor it profess to see in it a musical supremacy of this country above European countries. But it must be remembered that the large majority of skilled players who make up the personnel of our best orchestras are the products of European training. Most of our outstanding conductors are European-proved before they come here. The compositions, with a small percentage of exceptions, which engage our orchestras are the product of European writers. How successful the excursion of an American orchestra which will spend most of its time playing European compositions will be, remains to be seen, but there are at least a few onlookers who do not regard the trip with too much optimism.

Philharmonic.—In New York City the Philharmonic-Symphony held the center of the orchestral stage during the past year. After seven conductors had led the orchestra, Toscanini arrived and took over the band, remolding it into a more artistic and more satisfactory unit. There then followed ample evidence of the Toscanini cult, evidence from audiences and reviewers alike. How far this reckless conductor-hero-worship will go, there is no telling. But after a season of fervent and glowing admiration, a slight cooling of all these ardors begins to be visible among the critics. A noteworthy incident of the season was the retirement of Leo Schulz, 'cellist with the Philharmonic for thirty years. Mr. Schulz's last appearance was at the Pension Fund Concert, when verbal tributes were paid him, and a purse of five thousand dollars was presented to him.

Boston Symphony.—Boston, with its splendid orchestra and capable conductor,—Serge Koussevitzky,— enjoyed a brilliant season. New works of importance were heard during the year, and included Dukelsky's Symphony in F major, Josten's "Jungle," Halffter's "Sinfonietta," Bloch's "America" and Goossens's "Rhythmic Dance." During Dr. Koussevitzky's mid-winter vacation Enrique Fernandez Arbós, of Madrid, and Arthur Honegger were guest conductors, the latter bringing his tone poem "Rugby" as new composition. When the regular season had ended in May and Alfredo Casella had assumed the baton for the Pops concerts which still flourish in Boston, he had his own Concerto for violin and orchestra played, and later offered, as a novelty, Gershwin's "An American in Paris" which had had its premiere in New York a few months earlier. The end of October brought a Western trip which took the orchestra under Koussevitzky from the city for more than a week and which included Chicago, Minneapolis, Indianapolis, Buffalo and Pittsburgh.

The Philadelphia Orchestra saw the return of Stokowski to the podium. He came with renewed vigor and health, and has inaugurated a series of radio broadcastings and a still more revolutionary move, the abolishing of the rôle of concert-master. Instead of delegating this work to a single man, as is the usual custom, Mr. Stokowski has turned the work of training the strings over to various men of his band in turn. The net result has been a lowering of the quality of the string section. During Stokowski's absence, his place was filled by several conductors, including Artur Rodzinski, Alexander Smallens, Eugene Goossens, who took the orchestra on a tour of Washington, Baltimore and Wilmington; Ossip Gabrilowitsch, Bernardino Molinari and Clemens Krauss. A notable event of the autumn was the American debut of the electrifying José Iturbi, Spanish pianist.

Chicago Symphony Orchestra, having finally settled its many troubles with labor unions, enjoyed a comfortable and successful year. Under the long established Frederick Stock as conductor and Eric DeLamarter as assistant conductor, it played to large audiences. During the season, a Concerto for violoncello and orchestra by Mr. Stock was given its first performance with Alfred Wallenstein as the soloist Jan. 25, Normand Lockwood's suite, "Odysseus," was played March 22, and March 30 Chicago heard the first performance of La

Sowerby's new symphony. Honegger appeared as guest conductor in a program of his own works March 15. Feb. 8, Mr. Stock gave over half of his program to works by women, choosing a Scherzo, "Marionette" and a suite by Barbara Giuranna, apparently a writer of considerable promise and abilities, and a "Capriccio Ungarese" for pianoforte and orchestra by Yolanda Mero, the celebrated pianist.

San Francisco Symphony.—After a prosperous and well attended season of regular concerts, Alfred Hertz turned his San Francisco Symphony Orchestra over for the summer months to the various guest conductors who come to the West Coast for concerts in and near San Francisco. Bruno Walter proved to be so popular with audiences that one reviewer styled him the Toscanini of San Francisco.

Los Angeles.—Georg Schneevoigt completed his office as conductor of the Philharmonic Orchestra in April. To succeed him, Dr. Artur Rodzinski, assistant conductor of the Philadelphia Orchestra, was chosen conductor.

Hollywood.—The summer concerts at the Hollywood Bowl, given under the leadership of Eugene Goossens, were played to huge audiences, and the only major disturbance of the season came when the orchestra, which is a member of the Federation of Labor, was ordered out to enforce the demands of the union that a regular union member be employed to throw a light switch which a gardener had been looking after for two or three years. After one concert had been entirely abandoned, sending 10,000 people home disappointed, and after two others which consisted of piano versions of announced works and performances by announced soloists, the directors of the orchestra acceded to the demands of the union, under protest.

Minneapolis Symphony Orchestra.—Henri Verbrugghen, conductor, made a five weeks' pilgrimage in January and February, visiting thirty cities and traveling as far as Havana.

Portland, Ore.—Willem van Hoogstraten led the Portland Symphony Orchestra through its season.

Denver again heard the Civic Symphony Orchestra under Horace Tureman during a rather brief winter season of music, and in the summer invited guest conductors, including Rudolf Ganz and Henry Hadley, to lead the concerts given at the Elitch Gardens.

St. Louis and Omaha.—The series of guest conductors in charge of the St. Louis Symphony Orchestra included Eugene Goossens and Bernardino Molinari. The Omaha Symphony Orchestra, under Sandor Harmati, continued its monthly concerts.

The Syracuse Symphony Orchestra, of which Vladimir Shavitch is the regular conductor, enlisted the services of Arthur Honegger, the French composer-conductor who made so many appearances with orchestras during his visit in this country, as guest conductor.

Detroit.—Detroit's symphony orchestra, which usually is conducted by Ossip Gabrilowitsch, was heard under a series of guest conductors and Victor Kolar, the associate conductor of the orchestra, while Mr. Gabrilowitsch took a year's leave of absence. The net result was a stimulation of public interest in the orchestra, and a cordial welcome to Gabrilowitsch on his return in the autumn. Mr. Kolar opened the season, and thereafter the orchestra played under the leadership of Emil Oberhoffer, Willem van Hoogstraten, Eugene Goossens, Leopold Stokowski, Willem Mengelberg, Fernandez Arbós, Bernardino Molinari, Georges Enesco, Alfred Hertz, Georg Schneevoigt and Nikolai Sokoloff. Plainly Detroit sampled the country's conductors during the year.

Cleveland.—Nikolai Sokoloff took his orchestra through another thoroughly successful year. That Cleveland looks on its orchestra as an item of civic pride is plain in the establishment of a foundation of $6,000,000, secured by a gift of $1,000,000 from Mr. and Mrs. J. L. Severance and the balance by a campaign conducted with much success. A new hall, under construction at University Center, where are clustered a group of educational buildings centering around

Western Reserve University, will serve the orchestra for its concerts and will be used by other members of the group at the center for public meetings and other functions of the scholastic year.

FESTIVALS

University of Michigan.—The crop of Music Festivals in May was a large and impressive one. The gathering momentum of the propaganda for Music Week has resulted in the establishment in many cities throughout the country of large and well organized musical celebrations. But the finest work continues to be done by the long-established May Fertivals inaugurated in some places years ago. At Ann Arbor, in Michigan, the University of Michigan School of Music gave a series of six concerts which marked its thirty-sixth annual May Festival. At these concerts were heard Bloch's "America," Frederick Stock conducting, Chicago Symphony Orchestra and University Choral Union performing; Brahms's "Requiem," Wolf-Ferrari's "New Life," Saint-Saëns's "Samson and Delilah"; for new piece a cantata for children's voices by Jean Boyd, "The Hunting of the Snark." The soloists were Richard Crooks, Edith Mason, Efrem Zimbalist, Josef Hofmann, Paul Althouse, and Nevada Van Der Veer.

The Chicago North Shore Festival Association gave its twenty-first music festival at Evanston, beginning May 27. Peter Lutkin is the musical director of the organization. "Samson and Delilah" with Nevada Van Der Veer, Charles Marshall, Richard Bonelli and Herbert Gould, Bloch's "America" with Mr. Stock and the Chicago Orchestra, Bach's B minor Mass, Respighi's "The Birds," "Dryads' Kisses" by W. O. Miessner and Arne Oldberg's Symphonic Variations for piano, harp and orchestra were heard. The soloists included, besides those already mentioned, Edith Mason, Gina Pinnera, Anna Burmeister, Marie Morrisey, Paul Althouse, Josef Hofmann, and Alice Mock.

Bethlehem Bach Festival.—The twenty-third annual Bethlehem Bach Festival took place in Packer Chapel of Lehigh University, May 10 and 11. Dr. Wolle conducted performances of the St. Matthew Passion and the B minor Mass. The soloists included Ernestine Eberhard, Grace Divine, Arthur Kraft and Charles Trowbridge.

Cincinnati enjoyed its twenty-eighth biennial May Festival May 7 to 11. With Frederick Stock conducting, and Schumann-Heink, Austral, Vreeland, Manski, Van Der Veer, Van Gordon, Morrisey, Tibbett, Beddoe, Althouse, Davies, Patton and Gould as soloists, six concerts were given. The programs included Honegger's "King David," Williams's "Sea Symphony," and Pierné's "Children of Bethlehem."

The Reading Choral Society of Reading, Pa., gave its first annual festival in May, N. Lindsay Norden conducting. Brahms's "Requiem" and "Triumphlied" were sung.

Worcester.—For the seventieth time, the Worcester County Musical Association observed its annual festival at Worcester, Mass. Albert Stoessel conducted, and the programs from Oct. 2 to 5 included Josten's "Ode for St. Cecilia's Day," Hanson's "Lament for Beowulf," Parry's "Blest Pair of Sirens" and Pierné's "Children's Crusade." The three Marmein Sisters also presented their drama dances.

The Washington Festival of Chamber Music in the Library of Congress, the most distinguished of the festivals throughout the country, fell on Oct. 7, 8, and 9. The compositions played included Joseph Hüttel's prize piece, "Divertissement grotesque," for piano and five wind instruments, songs of the American South gathered by Marion Kerby, Graeser's arrangement of Bach's "Art of Fugue," a violin sonata by Bloch, and Whithorne's Piano Quintet. Taking part were the Roth String Quartet, the Gordon String Quartet of Chicago, the Barrére Ensemble of Wind Instruments, Harold Bauer, Arthur Loesser, Frank Bibb, Lewis Richards, and Leopold Stokowski.

CONCLUSION

String Quartets thrive and increase in number. Trios are heard with favor everywhere. Choral societies for the performance of new as well as old compositions continue to prosper and multiply. Symphony orchestras are well patronized and supported in all the larger cities of the country. At schools and colleges singing and instrumental groups lend impetus to the musical impulse which grows stronger year by year in the country. And even the radio, deplored by some, reaches thousands of listeners who otherwise would hear little music, and gradually initiates them into better and more worthwhile programs. Opera companies are perhaps more limited in their growth, due in large part to the immense expenditure necessary to ensure really fine performances. But throughout the land, music grows in a slow, healthy progress, enlisting larger numbers of performers and increasingly interested audiences each year.

THE THEATER

By J. Brooks Atkinson

Dramatic Critic, *The New York Times*

THE FIELD OF PRODUCTION

Fewer Plays.—The theatrical year defies the calendar by closing in June, and the records presented in this article accordingly represent the last half of one theatrical year and the first half of the next. It is worth mentioning in this connection because the last theatrical year was generally considered to be unusually flat, although the present year began with a buoyant grace. According to the statistics of the 1928-29 season, published during the summer, the 224 productions of the year in New York were thirty less than the productions of the year preceding. And the first half of the 1929-30 season also shows a slight decline in the number of productions. As usual various reasons are advanced to account for the falling off in productions, and those familiar with the impulsive ideology of the stage discount them all.

Competition of Talking Pictures.—It seems reasonable to assume that the competition of the talking films is beginning to be felt in the less pretentious quarters of the theater. At one time late in the spring every theater actually in use on Broadway was given over to the talking films, although that situation does not prevail during the height of the season. It has been generally noted that the number of theatrical productions made by unestablished producers has declined this year, and that the incompetent plays have been withdrawn more quickly than usual. Several of the recent fly-by-night productions have closed after one, two or three performances. Certainly there is less willingness among the "shoe-string" producers to tempt the fates. Reasoning by syllogism, the sages of the theater predict that in time the talking films will relieve the theater of its heavy burden of incompetent plays, thus permitting concentration on the finer aspects of the art. But reasoning by syllogism is no safe principle in the theater. What the future has in store, the future has in store; the skeptics are justified in letting the future speak for itself.

OUTSTANDING PLAYS

"Journey's End."—There have been no trends during the past twelve months. No particular style of production and no general points of view have tyrannized the theater into imitation. The interesting plays have been individual and unexpected. First among them comes R. C. Sherriff's war play, "Journey's End," which opened in the spring and is still visible at this writing. Written out of the war memories of an obscure English insurance adjuster, it made little impression upon the commercial managers when it was in script because the war play was generally considered unmarketable, and "Journey's End" committed the arch sin of having no parts for women. When at length it reached the stage it made a profound impression upon London audiences by reason of its portraits of character and the unassuming nobility of what it represents. A second English company quickly brought it to America where it was again instantaneously successful. Several other companies have been organized for American touring, and "Journey's End" has been played all over the world.

"Street Scene."—The Pulitzer Prize was awarded, amid general approval, to a realistic play of New York city, "Street Scene," the work of Elmer Rice, whose "On Trial" had been a technical sensation many years before, and whose expressionistic play, "The Adding Machine," is still remembered as an enterprising piece of work. "Street Scene," which is still on view at the close of the year, both in New York and Chicago, portrays the flowing life of a group of people living in a shabby brown-stone house on an obscure side street in central Manhattan. All the action takes place along the street or in the windows of the house. During the course of the play, Mr. Rice manages to detail the individual and racial characteristics of a polyglot neighborhood; it is very representative in general and very understanding in particular. Although "Street Scene" had been rejected by many leading producers in manuscript form it was an instantaneous success when produced under Mr. Rice's personal direction. Later in the season Mr. Rice produced an extravagant comedy, "See Naples and Die," burlesquing tourist life in Italy and perhaps burlesquing routine drama a little with its travesty of hackneyed characters and situation. Although it lingered for several weeks, and amused a good many theatergoers, it was not successful.

"Berkeley Square."—One of the finest plays of the season has been written by John Balderston, from a Henry James literary fragment, an American newspaper correspondent residing in London. It takes its title, "Berkeley Square," from the old Queen Anne house in London where all the action occurs. Although the pattern of the story is difficult to describe objectively, it may be set down as the fantastic drama of a modern who, by some unexplained feat of supernaturalism, lives for a month in the eighteenth century and meets, as a contemporary, several of his ancestors. Although fantasy in form, it is a tragedy of character in particular, and distinguished by sweet, sensitive writing, and a remarkable performance by Leslie Howard in the leading part. In London "Berkeley Square" had been only moderately successful. In New York it has been unusually popular.

"Serena Blandish."—Another ambitious venture, which was less successful, was the production by Jed Harris, of "Serena Blandish," dramatized by S. N. Behrman from a popular novel, and played with triumphant beauty by Ruth Gordon. Detailing the slightly satirical story of a complaisant young lady in search of a husband, it was chiefly remarkable for the oblique style of the writing and the unreal beauty of the acting and producing. After the failure of "Serena Blandish," Mr. Harris, who had produced "Broadway," "Coquette," "The Royal Family" and "The Front Page," and who was undoubtedly the most enterprising of the new producers, stopped producing, moved to London and finally closed his New York offices. Early in December he returned to New York with the mad look of an active producer again in his eyes.

COMEDY

"Strictly Dishonorable."—During the winter a bright but ineffectual little comedy, "The Guinea Pig," introduced Preston Sturges to the New York theater. In the autumn Mr. Sturges surprised every one, including himself, by turning up as author of the gayest and most accomplished light comedy of the season, "Strictly Dishonorable." It chronicled a romantic adventure in a New York speak-easy, and was distinguished for the felicity and wit of the dialogue, the sense of characterization and structure. Cast and acted attractively, it was enjoyable not only for its humors but for a promise of future achievements in the vein of artificial comedy.

"Many Waters."—Among the many importations from England was Monckton Hoffe's "Many Waters," which brought Ernest Truex home after several years on the London stage. It was a sentimental fantasy, revealing in many scenes the quiet gallantry of an average middle-aged couple who had preserved their mutual esteem and affection through the ordinary calamities of life. Mr. Hoffe had written it with taste and variety; but although "Many Waters" hung fire for several weeks, awaiting its special public, it was never actually successful.

"The Commodore Marries."—Late in the summer a meaningful comedy, based on Smollett's *Peregrine Pickle,* introduced Kate Parsons as a writer for the stage. The comedy was entitled "The Commodore Marries," referring to the gargantuan Commodore Trunnion, and the leading part was acted with great authority and vigor by Walter Huston. Although the comedy was outlandish, it was at bottom fairly bitter about the greed of the world vented upon a crack-brained idealist who was trying to live his life according to his fancy. The comedy had structural faults and had difficulty in rousing sympathy for a figure it had travestied in the first act. But it was an exhilarating *tour de force* by a writer who had not previously been represented on the stage.

PLAYS AND PLAYWRIGHTS

Martin Flavin, a Chicago business man who had once written a much admired play entitled "Children of the Moon," was at one time in the autumn represented by three plays simultaneously on view, "Broken Dishes," "Cross Roads" and "The Criminal Code." "Broken Dishes" was a domestic comedy with Donald Meek very amusing in the leading rôle. "Cross Roads," a drama of American college life, began with a stunning first act on the rigors of professional education during the years when a young man's natural impulse is for marriage. In the last two acts, however, the story moved off into a theatrical exhibition of young love in general, and did not justify the promise of the first act. In "The Criminal Code" Mr. Flavin wrote a terse, biting tragedy about the technical injustices of justice and the frightful beat of prison life upon a young man who is not an instinctive criminal. It is the most disturbing play of prison life exhibited in America since Galsworthy's "Justice."

Maxwell Anderson.—There were several interesting plays by established authors whose works are constantly on the boards. Maxwell Anderson, co-author of "What Price Glory" and author of "Saturday's Children," was represented by a tragedy of character entitled "Gypsy" with Claiborne Foster in the leading part. It was a play of young contemporaries in New York City, and the "Gypsy" of the title was an impulsive young lady of natural inconstancy. Although the play was well written and acted, the central character seemed strange to many people, and the play failed.

George Kelly, whose "Craig's Wife" took a Pulitzer Prize, turned up after an absence of two years with a finely-wrought study of middle class life in "Maggie the Magnificent." It was a tight, introspective drama, rather unprepossessing on the surface, and it failed.

George M. Cohan appeared early in the autumn as the chief character in a play of his own fashioning, "Gambling," which was very popular as a well acted crime story.

Rachel Crothers, who has been writing plays for years, produced an engaging comedy entitled "Let Us Be Gay," with Francine Larrimore in the leading part. It was expertly written and very pleasant into the bargain, and ran for nearly the full year.

Some English Plays.—In April John Drinkwater's old-fashioned comedy, entitled, "Bird In Hand," came from London with an English cast, and immediately found a steady public. Mary Ellis and Basil Sydney found a good vehicle for their acting in A. A. Milne's light comedy entitled "Meet the Prince," which lingered for several months. Another play by Mr. Milne, entitled "Michael and Mary," had its world première in New York towards the end of the year and settled down immediately to general favor. Sean O'Casey's war play, "The Silver Tassie," which had been the subject of acrimonious dispute for nearly two years, was finally produced in America by a new group entitled The Irish Theater. Although it gave evidence of being a disturbing, ironclad play, it was so wretchedly acted and produced that no one could make much of it. Indications at the end of the year were that Charles Cochran and Arch Selwyn would import the company which was giving "The Silver Tassie" in London simultaneously.

Eugene O'Neill. "Dynamo," his first play since "Strange Interlude," was very nearly a complete failure when produced by the Theatre Guild. O'Neill had announced it as the first of a trilogy on the subject of modern religion. Using the characters as symbols and sprinkling his play with the feverish "asides" he had used in "Strange Interlude," he revealed the tragedy of a footless young man who attempted to substitute electricity for the orthodox God he had discarded. With two or three exceptions opinion seemed to be that Mr. O'Neill had merely made a melodrama of hackneyed situations. After the subscription season the Guild withdrew the play, and Mr. O'Neill abandoned his plan for a trilogy and devoted himself to working on a very different type of play for production two seasons later. While "Dynamo" was on the stage "Strange Interlude" was still drawing good houses and "S. S. Glencairn" was revived at the Provincetown Theatre. When the Guild made ready to take "Strange Interlude" to Boston the censor and the Mayor of Boston refused permission. "Strange Interlude" was accordingly played in Quincy, where Boston audiences went to see it.

George S. Kaufman, who has written innumerable plays, most of them in collaboration, was co-author with Ring Lardner of "June Moon," and with Alexander Woollcott of "The Channel Road." "June Moon" was a satire of the popular song industry, bitterly satiric and quite the funniest play of several years, brimming with explosive lines. It was one of the two or three most popular plays of the season. "The Channel Road" was a dramatization of Maupassant's "Boule de Suif," and represented Mr. Woollcott's first writing for the stage. Although it was well-liked by many theatergoers it was withdrawn after about two months of small houses.

PLAYERS AND PRODUCERS

Ethel Barrymore.—When the year began Ethel Barrymore was still playing "The Kingdom of God," by the Spanish Sierra. In the spring she appeared in "The Love Duel," adapted by Zoe Akins from a Continental play by Lili Hatvany. It was a feeble drama of rather unimaginative circumstances, but Miss Barrymore's brilliant acting carried it for several weeks.

Belasco.—In August Mr. Belasco began the season with a well directed and well acted comedy entitled "It's a Wise Child," by Laurence E. Johnson. The lines and the impertinent situation, in addition to the finished acting, made it one of the popular amusements of the season.

Frank Craven emerged in November as the leading actor in a familiar comedy entitled "Salt Water," by Dan Jarrett. It was concerned with the tribulations of an ineffectual mariner who did not want to buy the local ferry, but found himself owning it in spite of himself.

Morris Gest and David Belasco.—Late in the spring presented the Freiburg Passion Play in the Hippodrome on a grand scale. The two Fassnacht brothers, who had been acting in it for several months through the Middle West, appeared as Christ and Judas. It was an elaborate production, but inappropriate for sacred drama, and it stayed less than two months in New York.

CRIME AND MYSTERY PLAYS

The autumn began with an avalanche of crime and mystery plays: "Soldiers and Women," "Murder on the Second Floor," "Scarlet Pages," with Elsie Ferguson, "Subway Express," "Scotland Yard" and several others. Most of them were badly written. But "Remote Control" had some prestige as the first play set in the studio of a radio organization, and "Rope's End," by Patrick Hamilton, was popular for three or four months as a grewsome tale of murder purely for excitement. Mr. Hamilton declared that it was based on the suggestion of DeQuincey's *On Murder as a Fine Art*, but the situation was very nearly identical with the Loeb-Leopold crime in Chicago.

REVIVALS

"Sherlock Holmes."—Among the revivals was William Gillette in "Sherlock Holmes." Mr. Gillette returned for a farewell engagement at the age of 74, and after more than a decade of retirement. Although his booking in New York was for only three weeks the great popularity of the revival compelled him to cancel other bookings out of town and extend the New York engagement to six weeks.

Miss Le Gallienne's Civic Repertory.—Four plays by Chekhov were put on in English. At Miss Le Gallienne's Civic Repertory, where "The Three Sisters" had already been produced, "The Cherry Orchard" was staged with Nazimova in a leading part, and "On the High Road," in one act, was put on as a curtain riser. In the autumn Miss Le Gallienne began her fourth season with "The Sea Gull," with Ben-Ami as Trigorin. Previously "The Sea Gull" had been played in matinee performances by an association of actors, and later "Uncle Vanya" was put on in an adjoining theater by another group.

Other Revivals.—Other notable revivals were Ibsen's "Lady of the Sea" and "Hedda Gabler" by Blanche Yurka, and the Players' revival of "Becky Sharp" with Mary Ellis in the title rôle.

MUSICAL COMEDY

Among the notable musical comedies were "Follow Thru," a golf skit, "Sweet Adeline," with a melodious score by Jerome Kern, "Bitter Sweet," for which Noel Coward had written the play, the music and the lyrics, and "Sons O' Guns," which brought Jack Donahue back to New York as a very merry comedian and introduced Lily Damita to the musical comedy stage and an appreciative audience.

MOTION PICTURES

By Mordaunt Hall

Motion Picture Critic, *The New York Times*

TALKING FILMS

General Progress.—There has been marked improvement in talking pictures in 1929, particularly in the last three months. Early defects, such as the lisp, occasioned by the high-frequency of certain consonants, and the unpleasant loudness of voices, which in the beginning created a general aversion for this type of entertainment and a hope for a return to silent films, disappeared, and what is emphatically encouraging is the fact that the audible productions demand a more intelligent type of actor, because they have to speak their lines.

Acoustical Improvement. — The acoustical experts have used their efforts not only in the studios, but also in the theaters. They have succeeded in obtaining perspective of sound on the screen, and in the cinemas they have persuaded the managers to keep the volume of sound down to a natural level. It has been decided that the best effects in dialogue are when audiences have to listen keenly, as they do in listening to stage productions. Moreover in the recording of the sounds, the acoustical engineers found that some of the deficiencies in the final result were due to a double reverberation in the studios. At the same time they learned that a single reverberation, such as would occur ordinarily, added to the life-like quality of the audible offerings.

Better Sound Apparatus.—One of the chief reasons for the wholesale denunciation of vocalized screen works was due to cheap installations in theaters, and so soon as the managements discovered that they were driving away patrons by poor reproduction of pictures that had met with approval in the theaters in large cities, many of them decided on rewiring their houses with the more satisfactory and costlier type of sound apparatus.

Out-of-doors Sound Pictures.—In the course of the year it was also learned that effective sound productions could be made in the open, but only in areas that were free from unwanted noises. "The Virginian" and "In Old Arizona" are excellent examples of out-of-doors pictures.

Arliss on Talking Pictures.—George Arliss, who is a staunch adherent of the stage, after two experiences with Vitaphone productions (those recorded on disks), said that he believed that the talking films eventually would prove as great an influence for the teaching of dramatic literature as the phonograph has been in improving the popular taste for music.

Influence of Actors.—The audible film resulted in attracting to Hollywood many of New York's prominent actors, whose worth was quite evident when they were cast in the productions with ordinary silent screen players. These efficient performers have not only helped the screen by their own acting, but also by their example to less experienced persons.

Theaters.—William Fox was responsible also for the innovation of turning the Embassy Theatre into a house for audible news films. It proved enormously popular, so successful in fact that it has been decided to have special news reel theaters in other parts of New York City and also in most of the large cities throughout the country.

Movietone Subjects. — In these movietone short subjects there have been shown a number of dramatic news incidents. One of them was a criminal making a confession of his guilt, another showed the arrest of three youngsters as opium smugglers, and still another dealt with sixteen persons, one a woman, dropping by parachute from an airplane. Aside from such subjects there have also been heard through the movietone a number of celebrities, including the President of the United States, Sir Arthur Conan Doyle, Clemenceau, H. G. Wells and Sir Oliver Lodge.

WIDE FILM OFFERINGS

Advantages of New Film.—But with all the strides made by audible films, a revolution this year is anticipated in screen offerings. It will come through the use of a double width film, which when projected will fill any screen that stretches from one side to the other of the proscenium arch of the theaters. William Fox exhibited amazing results obtained out-of-doors with this wide film, which not only increases the size of the screen picture, but also gives an illusion,—only an illusion,—of depth. He also offered a production made in a studio with the large size film, but, as it was pictured with only one camera and the director was handicapped by having to deal with stage settings and illumination intended for the small or standard size film, then being photographed, the results did not give a fair conception of the possibilities of this new invention. Producers may delay turning out pictures with this Grandeur process, as it is known, until they have disposed of their other important standard-sized film productions, as they feel that there will be an overwhelming demand for the large-size film pictures and the others will, therefore, fail commercially. Another point in favor of delaying the wide film offerings is that the theaters will have to be equipped with special projection apparatus and screens.

The wide film demands increased lighting and greater stage space in production, but to compensate for this on the enlarged screen it will mean that the spectator virtually will be able to follow the story, without the many close-ups or patches of scenes interfering, as they do now, with the action of the players. Another advantage this new scheme of things possesses is that it gives the producer a wider sound track, which results in even more modulated and agreeable tones than are at present being reproduced. And, while the stereoscopic angle is only an illusion, it is nevertheless most effective.

Fox Demonstration. — Mr. Fox showed his first Grandeur subjects in the small Gaiety Theater, because he thought that if he presented these features in the Roxy Theatre or in any other large cinema, the exhibitors might contend that while such a wide-film picture might go well in a spacious house, it might fail in a smaller one. Interested exhibitors realized that in demonstrating the worth of this new idea in the Gaiety, the projection operators were handicapped by the lack of space in the projection booth of that particular playhouse.

More than one producing concern is working on a wide-film, but Mr. Fox has chosen a 70 millimetre width, which happens to be practical for the makers of the celluloid stock. The Famous Players Lasky was interested in a 57 millimetre width, which, as the Eastman Company makes its stock in 70 millimetre width, was obviously not as practical. However, there is no doubt but that in the early months of 1930 there will be presented one (if not more) audible pictures made on this wide film.

CURRENT TALKING PICTURES

"The Love Parade."—Far more interest is attached to the best talking films of the year than was hitherto attached to the silent ones. The audible angle of the screen, for instance, attracted players whose forte was their voices. There was for instance, Maurice Chevalier, the French entertainer, who appeared in two talking and singing films, one a tawdry affair in which he himself was signally successful and another, which was directed by that master, Ernst Lubitsch. This latter film was known as "The Love Parade" and it was easily one of the outstanding features of the year.

"The Taming of the Shrew."—Douglas Fairbanks and Mary Pickford essayed a pictorial version of Shakespeare's farce, "The Taming of the Shrew," and while it was cleverly done, it lacked the flavor of Shakespeare, despite the fact that virtually only the Bard's words were employed. Mr. Fairbanks gave a capital performance as Petruchio, but Mary Pickford, attractive though she was, evidently did not feel that she could risk her popularity in the closing sequences and, therefore, she compromised by winking as she delivered the exhortation to wives.

"Disraeli."—Possibly the outstanding talking picture of the year was George Arliss's interpretation of Louis N. Parker's romantic play, "Disraeli." It proved to be immensely successful financially and at the present writing is still sojourning on Broadway.

"Bulldog Drummond."—The dialogue translation of "Bulldog Drummond," with Ronald Colman in the leading rôle, was another worthy and highly popular attraction. Mr. Colman gave a finished performance as the redoubtable Briton, who relishes excitement after a period of boredom following the World War. Mr. Colman shrewdly poked fun at the incidents and the photoplay was, perhaps, a more successful entertainment for that reason than the original stage play.

Musical Films.—Owing to the unprecedented success of a musical film production, called "The Broadway Melody," the Hollywood producers turned quickly to making such vehicles and in some instances they met with great success. Old musical comedies were turned into talking and singing pictures, but many of them failed through the fact that the screen-performers did not possess the necessary talent.

Will Rogers, who has acted in several silent pictures, was cast in a talking film called "They Had to See Paris." It was a subject which gave Mr. Rogers, the cowboy comedian, full opportunity for his flow of wit.

John Barrymore, an actor who has also often been seen in the mute films, appeared toward the end of the year in his first talking picture, one titled, "General Crack," in which he manifested the value of the audibility of the screen. In this production Mr. Barrymore's acting was far superior to any of the others in the cast and his cultured voice enhanced his performance. Mr. Barrymore was also seen in a short sketch in a Vitaphone revue. In this, he delivered Gloster's soliloquy from Henry VI. This was remarkably impressive, first because of Mr. Barrymore's superb piece of acting and because he was able, through the scope of the screen, to appear in everyday clothes a second or so before, and introduce himself in the Shakespearean rôle.

Lionel Barrymore finally turned from acting in vocalized films to directing them and he fashioned an exceptionally fine version of the old drama, "Madame X," with Ruth Chatterton in the leading rôle.

"Hallelujah."—King Vidor, who directed "The Big Parade," the highly successful silent film of a few years ago, concentrated on a production with a negro cast, called "Hallelujah," in which there were a number of vivid and memorable glimpses. In this film, Mr. Vidor made the most of his opportunities for drama through sound, either by voices, singing, the gurgling of water, or the brushing of persons through undergrowth.

Comedy.—So far as comedy is concerned, this was, of course, not neglected by the film makers and one particularly effective piece of work was the translation of the play, "Three Live Ghosts," in which the London cockney voices were recorded with good effect. It was one of those films that caused spectators to forget about the mechanism of sound through sheer interest in the talking shadows before them. Another comicality that was produced with a lavish hand was a version of the old play, "The Gold Diggers," which, although it was raucous, possessed streaks of capital fun that earned a healthy reward for its producers.

"The Sky Hawk."—The Fox Film Corporation undertook the difficult task of portraying in a melodrama, known as "The Sky Hawk," an air duel between a Zeppelin and an airplane over London. It was a distinct achievement and it deserved to be, for no pains or money were spared to gain the desired effect of a Zeppelin bombing London. It is an interesting fact that the splendid results were obtained through building a miniature of the British metropolis. It was not constructed in any haphazard manner, for it was realized that the conspicuous buildings would have to be recognizable replicas of the real ones. This miniature is said to have cost $40,000. It was far and away the most significant use to which miniatures have been put in this line, for this replica of London was 260 feet in length and eighty feet wide. Some forty of the prominent buildings were reconstructed from brueprints on an eighth of an inch scale and among them were the Houses of Parliament, the Tower of London, Chelsea Hospital, St. Paul's Cathedral, the Tower Bridge, Waterloo Bridge, and a number of other buildings and also railroad stations. To gain the effect of houses, there were, of course, thousands of duplicates, suited to the particular locality in which they were placed. Besides the miniature, which incidentally showed the winding Thames, the producers fashioned small Zeppelins and to carry out the illusion large compartments of the Zeppelin, copied from special drawings were set up in the studio. To add to the sound effects the producers had the players, who impersonated the German officers of the Zeppelin, talk only in German, except when they were seen on *terra firma* in Belgium interrogating a British flying officer. It was all done extremely cleverly, and it was a masterly example of coupling sound with the wizardry of the camera.

"The Cock-Eyed World."—The greatest money maker of the year was perhaps a somewhat reprehensible but often witty feature, labeled "The Cock-Eyed World." This picture broke all records at the Roxy Theater, by taking in $175,000 in a week, which is about $30,000 more than the business done by any other film since the opening of that theater. It stayed there for four weeks, during which time it topped all predecessors.

"Hunting Tigers in India."—An instance of making use of sound in a silent picture that was filmed before pictures became audible, was "Hunting Tigers in India," a record of the Vernay-Faunthorpe expedition, which was inoculated with the voice of Commander George M. Dyott, who described the various incidents as they were unfolded on the screen. Commander Dyott was at first perceived talking in his own home and subsequently he faded out of the picture, but his voice was heard as he took the audience on the journey to India. This made an amazing difference to the photographic record, for no such descriptions could ever have been set forth in the film through the medium of titles, space for which is of necessity extremely limited.

SILENT PRODUCTIONS

The idea that Hollywood was going to make but few silent productions was at first received dubiously by outsiders, but the producers subsequently proved that they meant what they said, for only one or two silent American productions came to the Broadway screens. Curiously enough, however, there was a French silent production which was the equal of any picture that has been produced. It was called "The Passion of Jeanne d'Arc," and it dealt with the trial of the Maid of Orleans. It was by no means a financial success, chiefly because it was extremely harrowing. Nevertheless, Maria Falconetti, an European actress, gave a most beautiful performance and throughout the scenes poetry was blended with strong drama. This film was directed by a Dane named Carl Dreyer, whose camera angles were unusual and wonderfully impressive. The only other silent production of note was a Hollywood film, with Greta Garbo, directed by Jacques Feyder, a Frenchman, who has done extraordinarily good work in the past. This is an interesting commentary on the silent productions.

COGNATE SOCIETIES

GENERAL

AMERICAN ACADEMY IN ROME, 101 Park Ave., New York City.

AMERICAN ACADEMY OF ARTS & LETTERS, 633 West 155th Street, New York City.

AMERICAN CERAMIC SOCIETY, Lord Hall, Ohio State University, Columbus, O.

AMERICAN FEDERATION OF ARTS, The Barr Bldg., Farragut Sq., Washington, D. C.

AMERICAN FINE ARTS SOCIETY, 215 W. 57th St., New York City.

AMERICAN INSTITUTE OF ARCHITECTS, 101 Park Ave., N. Y. C.

AMERICAN NUMISMATIC SOCIETY, 156th St. and Broadway, N. Y. C.

AMERICAN SCENIC AND HISTORIC PRESERVATION SOCIETY, 154 Nassau St., N. Y. C.

AMERICAN WATER COLOR SOCIETY, 215 W. 57th St., N. Y. C.

ARCHÆOLOGICAL INSTITUTE OF AMERICA, New York University, University Heights, New York City.

ARCHITECTURAL LEAGUE OF NEW YORK, 115 E. 40th St., New York City.

ART ALLIANCE OF AMERICA, 65 E. 56th St., New York City.

ART CENTER, INC., 65 E. 56th St., New York City.

ARTISTS GUILD, 420 Lexington Ave., New York City.

FINE ARTS FEDERATION OF NEW YORK, 215 W. 57th Street, New York City.

GRAPHIC ARTS BOARD OF TRADE, 291 Broadway, New York City.

GUILD OF FREE LANCE ARTISTS, 420 Lexington Ave., New York City.

HISPANIC SOCIETY OF AMERICA (THE), 156th St. West of Broadway, New York City.

MUNICIPAL ART SOCIETY OF NEW YORK, 119 E. 19th St., N. Y. C.

NATIONAL ACADEMY OF DESIGN, 175 W. 109th St., New York City.

NATIONAL ASSOCIATION OF WOMEN PAINTERS & SCULPTORS, 17 E. 62nd St., New York City.

NATIONAL INSTITUTE OF ARTS & LETTERS, 633 W. 155th Street, N. Y. C.

National Sculpture Society, 115 E. 40th St., New York City.

New York Society of Architects, 25 W. 39th St., New York City.

New York Society of Craftsmen, 65 E. 56th St., New York City.

Society of Arts and Crafts, 721 Madison Ave., New York City.

Society of Beaux Arts Architects, 126 E. 75th St., New York City.

Society of Illustrators, Art Center Building, New York City.

Society of Independent Artists, Inc., 1947 Broadway, New York City.

DRAMA

Actors Equity Assn., 45 West 47th St., New York City.

Actors Fidelity League, 11 E. 45th St., New York City.

Actors International Assn., 701 Seventh Ave., New York City.

American Dramatists, 2 E. 23rd St., New York City.

American Dramatists and Composers Society, 2 E. 23rd St., New York City.

Drama League of America, 59 E. Van Buren St., Chicago, Ill.

English Folk Dance Society, 159 E. 33rd St., New York City.

Episcopal Actors Guild, 1 E. 29th St., New York City.

International Theatrical Assn., 1540 Broadway, New York City.

Motion Picture Directors Assn., 234 W. 55th St., New York City.

Motion Picture Producers and Distributors of America, Inc., 469 Fifth Ave., N. Y. C.

Motion Picture Theatre Owners of America, 1650 Broadway, N. Y. C.

National Assn. of the Motion Picture Industry, Times Bldg., New York City.

National Board of Review of Motion Pictures, 70 Fifth Ave., New York City.

Photoplay League of America, 221 W. 57th St., New York City.

Theater Guild, Inc., 243 W. 52nd St., New York City.

MUSIC

American Guild of Organists, 217 Broadway, New York City.

Cantors Assn. of America, 40 Second Avenue, New York City.

Chorus Equity Assn. of America, 110 W. 47th St., New York City.

Grand Opera Society of New York, 939 Eighth Ave., New York City.

Jewish Federation for Music and Drama, Inc., 5 Beekman St., New York City.

League of Composers, Inc., 29 W. 47th St., New York City.

MacDowell Endowment Fund Assn., 1 E. 57th St., New York City.

Musical Alliance of the U. S., Inc., 501 Fifth Ave., New York City.

National Bureau for the Advancement of Music, 45 W. 45th St., N. Y. C.

National Music League, 113 W. 57th St., New York City.

National Patriotic Song Committee, 62 Washington Sq., S., New York City.

New York Community Chorus, 113 W. 57th St., New York City.

Opera and Drama Society, 1730 Broadway, New York City.

Oratorio Society of New York, 113 W. 57th St., New York City.

People's Chorus of New York, 41 E. 42nd St., New York City.

Philharmonic Society of New York, 113 W. 57th St., New York City.

Russian Balalaika Orchestra Assn., 1560 Broadway, New York City.

Sunday Symphonic Society, 113 W. 57th St., New York City.

Symphony Society of New York, 33 W. 42nd St., New York City.

DIVISION XXVII

EDUCATION

ELEMENTARY EDUCATION

By James F. Hosic

Professor, Teachers College, Columbia University

SCOPE AND CONTENT

National Education Committee Report.—During the year progress has been made in determining the scope and in defining the content of elementary education. A committee of the Department of Superintendence of the National Education Association, of which Herbert S. Weet, superintendent of schools in Rochester, New York, was chairman, confirms the finding of previous committees, namely, that the prevailing type of elementary school consists of eight grades or years. This is rapidly being replaced, however, by a school made up of a kindergarten of one or more years and six regular grades, followed by an intermediate school often called a junior high school. The committee takes the ground that this development is sound and will continue. Its further report upon the objectives and problems of elementary education assume that the scope just indicated is normal.

GRADE PROMOTIONS

No widely recognized standards for admission to kindergarten or to first grade are observed. Children enter the former between the ages of four and five and are promoted to first grade on the basis of chronological age, judgment of the teacher, mental age, scores on special prognostic tests, or simply time spent. Promotion from grade to grade above the kindergarten is still mainly dependent upon the pupil's progress in reading or arithmetic, though many attempts are being made to establish a more rational basis. Likewise a single course of study is still almost universally provided for all pupils except those who are subnormal, that is, markedly deficient in intellectual ability. The attempts that have been made to devise multiple courses for groups of children of different aptitudes have not been sufficiently widespread to enable us to forecast the outcome. It seems clear, however, that the ever-widening recognition of the facts of individual differences in school children will lead eventually to accepted methods of dealing with them. At present the procedures adopted are mainly administrative. Pupils are segregated according to "ability"; they are permitted to advance at different rates and the brighter ones are "accelerated"; or they are allowed to work alone so as not to be hindered by the pace of others. All such devices are obviously external and do not reach the heart of the difficulty. Progress will no doubt continue until programs of study and experience have been developed in accordance with the varying needs and capacities of groups of pupils of different sorts. At present only the more bookish pupils—those to whom the more abstract types of learning are congenial—are at all adequately provided for in the elementary school. There is need of a much greater supply of concrete materials for use in graphic expression, industrial arts, and elementary science, as well as in the illustration of the older subjects, such as arithmetic, history, and geography.

ACTIVITIES OF THE ELEMENTARY SCHOOL

Student Requirements.—Distinct advance is being made in the redirection of the activities of the elementary school. This appears in two ways. In the first place there has been a distinct shift of emphasis in regard to the aims set up. Formerly the mastery of subjects thought valuable in adult life occupied the chief place in the consideration of the purposes of the common school. Now the tendency to consider first the present state and requirements of the pupil has quite generally asserted itself. Educators ask what children can actually do now rather than what they will probably be expected to do later on in the upper classes.

New Conceptions in Teaching.—The effect of this change of view appears in general statements concerning the purpose and work of the school rather than in radical changes in the curriculum itself. The subjects taught now are in general the same as those taught fifteen years ago. But the point of view from which they are taught is different. Silent reading for ordinary purposes rather than reading aloud for elocutionary effect is now the mode. Composition consists in speaking as well as writing, and grammar has become merely a part of the theory of acceptable expression. Arithmetic comprehends wide reading of quantitative facts and such practical matters as budgets, saving, and graphs as well as the fundamental operations, common and decimal fractions, weights and measures. Geography now offers opportunity for acquaintance with conditions of human life and appreciation of the mutual interdependence of nations. History deals with home and industrial life of the past, not merely politics, government, and war. The arts are seen to exist for intelligent enjoyment, not merely for practice in techniques. Elementary science is concerned with plants and animals, and considers forces in action. In general, the conception is that of the place the various school subjects can and do occupy in the life of the educated citizen and of the place they may occupy in the developing experience of children.

Integration of Courses.—In the attempt to reorganize the school courses in the light of these newer views, many school systems are undertaking experiments in the combination or "integration" of subjects. The attempt most frequently made is that of putting together as a single subject civics, history, and geography and of referring to the whole as a course in "social studies." Occasionally arithmetic, elementary science, hygiene, or some other subject is included. Such courses are now to be found in all grades of the elementary school and sometimes occupy as much as a third or even more of the school day. They are usually organized in terms of fairly inclusive problems, such as, "How do we get our houses?" "When and how did man learn to use boats?" "How did the American spirit emerge out of the New World?" Extensive use is made of library materials; the pupils take a large part in carrying on the activity and in organizing the results, and there is much collateral work in expression through language and the fine and industrial arts.

Relations of Teacher and Pupil.—These courses are thus made up of large units that succeed each other in an order more or less logical, so that details are supposed to be seen in their larger relations. The tendency to experiment with new units of instruction is widespread in elementary schools. These are now commonly referred to as units of activity, units of experience, or projects and a curriculum made up of them is called an activity curriculum. This term is intended to suggest that the pupils have a hand in all that goes on, that they are free to exercise initiative, proffer judgments, exercise a measure of self-direction and self-control, and understand something of the significance of what they do. It implies a changed relationship of teacher and pupil, a greater community of interest, more of stimulation and guidance and less of the direct exercise of authority. The experience which the pupil is afforded is more complete, many-sided, and dynamic; it provides opportunity for practice in meeting new situations and cultivates readiness and adaptability rather than merely making conventional behavior habitual.

Individual Instruction.—A good example of controlled experiment in city school systems is that now in progress in Detroit. The purpose is to determine the relative merits of different methods of individualizing instruction. Several schools of the platoon type were selected, part of them to try particular methods and the others to act as controls or bases of comparison. Every possible effort has been made to reduce the variables so as to isolate the factors under investigation. The whole procedure has been carefully worked out and is carried on under expert guidance.

Objectives.—The Elementary Education Division of the New York State Department has recently published a report of a two-year coöperative study to determine "Cardinal Objectives in Elementary Education." By obtaining a consensus of opinion among school superintendents, principals, and teachers, the following statement of objectives was arrived at: "It is the function of the public elementary school to help every child: 1. To understand and practice desirable social relationships; 2. To discover and develop his own desirable individual aptitudes; 3. To cultivate the habit of critical thinking; 4. To appreciate and desire worth-while leisure activities; 5. To gain command of the common integrating knowledge and skills; 6. To develop a sound body and normal mental attitudes." What progressive schools in the State are doing to give opportunity for these attainments is suggested by means of a series of illustrations of actual classroom work.

PUBLICATIONS AND BULLETINS

The literature of this subject is already voluminous and large additions have been made to it in the past year. Those interested will do well to consult the publications of the Progressive Education Association, which reflect the practices of numerous private schools, such as the Francis W. Parker School in Chicago and the Lincoln School in New York; also such educational journals as *Childhood Education, Primary Education, and Educational Method*, each number of which will be found to contain reports from the more progressive public schools. Many cities now issue regular and special bulletins, in which will be found circumstantial accounts of attempts to apply newer methods and reform the program of studies. Among the cities that have issued such bulletins during the past year are Raleigh, N. C., Baltimore, Oakland, Calif., Seattle, Cleveland, Ann Arbor, Mich., Detroit, Rochester, N. Y., St. Louis, Minneapolis, Denver, Dayton, O., San Francisco and Los Angeles.

Among the more radical publications that have recently appeared, that called *The Child Centered School*, by Professor Rugg, has undoubtedly attracted the most attention. The writer is severely critical of existing practices in elementary schools and at the same time chides the "progressive" schools for their failure to make use of scientific method in devising their programs or in measuring their results. His most emphatic plea is for more opportunity for "creative expression," "free and spontaneous activity." In art, music, and dancing he professes to find great possibilities not now realized, and refers with approval to such poetry and prose as is illustrated in Mearns' *Creative Youth*. How far such ardent pleas as this for thoroughgoing reform will influence the mass of the schools is, of course, impossible to say.

EDUCATIONAL RESEARCH

Science.—Led by the university schools of education, educators everywhere are giving more attention to scientific investigation, the bulk of which either directly or indirectly concerns elementary education. Progress in this field is summed up in a recent bulletin of the University of Illinois, called *Ten Years of Educational Research*, by Professor Monroe.

Research Bureaus and Journals.—The work of organized bureaus is described in a monograph published by Ohio State University, entitled *Or-*

ganized Research in Education. This is a study made by Harold B. Chapman. Extensive bibliographies of research are published annually by the United States Bureau of Education, and an excellent Bureau of Research is maintained by the National Education Association at its headquarters in Washington. Almost all educational journals of national scope give more or less space to reports of research. A list of these journals is published annually by the Educational Press Association of America and also from time to time in the directory issued by the United States Bureau of Education. The organ of the American Educational Research Association is a publication entitled the *Journal of Educational Research.*

SECONDARY SCHOOLS

By Philip W. L. Cox

Professor, School of Education, New York University

GENERAL

Throughout a very large section of the country the number of candidates for teaching positions in secondary schools, qualified under state and city regulations, is this year considerably in excess of the number of positions available. This condition has resulted chiefly from more generous or adequate salary schedules. Communities are generally taking advantage of the condition to obtain better qualified teachers and to retain satisfactory teachers longer. Consequently, teachers-in-service and candidates awaiting positions are more frequently pursuing advanced courses in graduate schools of education. In New York City, the Board of Education requires of most teachers that they take at least one thirty-hour course a year accepted by a standard college to meet the "professional alertness" requirement for salary advancements. In every section of the country, there have been constructed beautiful, well-planned and rather costly school buildings. Indeed, these have been called the most effective and characteristic architectural feature of typical American cities and villages.

OUTSTANDING PROBLEMS

Every year shows an advance in the earnest and penetrating public discussion of educational problems, particularly at the secondary school level. Three outstanding problems affecting secondary schools have been dealt with in magazine articles, public pronouncements, and polemic arguments during the current year. They are: first: Are secondary schools to educate all of the adolescent children who wish to attend them? second: Can and will the local communities and states support so inclusive and gigantic a program? third: What provisions can be made to insure or improve the articulation between the different school units?

SCOPE OF SECONDARY EDUCATION

High School Attendance.—Whatever the philosophical or theoretical conclusion to the first of these questions, the people of urban communities are giving a realistic answer which no board of education or school officer can challenge successfully. While less than 25 per cent of the high schools in this country are situated in centers of 2500 or more population, over 70 per cent of the high school pupils attend these schools. About half the children aged 15 to 18 years are in public high schools and almost 5 per cent more attend private secondary schools. Rural communities, though making heroic efforts to provide high school facilities for their children, have not as yet reached them anywhere nearly so successfully as have urban centers. Although over half the children between 15 and 18 live in rural areas, scarcely more than a quarter of these pupils attend high schools; whereas, in the urban community about three quarters of all children of high school age are actually enrolled in the secondary schools.

These estimates are based on data contained in *Bulletin* 1927, no. 33, U. S. Bureau of Education: Statistics of Public High Schools, 1925-1926.

Growth of secondary schools during the seven years, 1922-1929, was relatively slightly less rapid than in the preceding decade. However, the rate of increase remains astoundingly high. It would seem that nothing except prolonged economic depression can prevent the realization in urban America of almost universal secondary education. At present, nevertheless, the percentage of children of skilled and common laborers who complete high school is small compared with the children of professional men, managers, proprietors, and of those engaged in commerce.

Curriculum.—Since only a quarter of unselected children can successfully pursue conventional academic studies, and since many of those who can do so are quite unwilling to try, the rapid expansion of the curriculum to provide for the children who are less abstract-minded or less academically interested must continue. The demand for a more liberal high school curriculum in which social, artistic, industrial, and homemaking subjects will be raised to equality of importance with the academic subjects can no longer be denied. State departments of education, even in such conservative states as New York, Virginia, and Arkansas, are endeavoring to persuade high school faculties and boards of education to give more adequate curriculum opportunities for non-academic pupils.

FINANCIAL CONSIDERATIONS

Education Costs.—The cost of the many new school plants, of more nearly adequate salaries for the greatly increased number of teachers, and of the many special services which characterize the modern secondary school is very great. Complete data are unavailable for the cost to the local communities and states for the support of secondary schools. In 1926, 4973 of 21,700 secondary schools which were separately housed reported to the Bureau of Education that buildings and grounds were valued at over $1,667,000. In that year 2193 high schools spent $87,672,504 for new buildings, sites, and improvements—an average of $37,500 per school.

Opposition to Expenditures.—An unmistakable growing criticism and active hostility to these increasing expenditures are making themselves felt. At least one book and several significant magazine articles have assailed the alleged "over-organization" and wasteful expenditures in the public schools. Real estate associations, "School Tax Leagues," and, in Cleveland, the Association for Retrenchment in Public Expenditures, have organized opposition to any tax increases.

Counter Support.—On the other hand, the Research Department of the National Education Association has carried on an active campaign of counter-publicity. In two recent bulletins entitled *Can the Nation Afford to Educate Its Children?* and *Can the States Afford to Educate Their Children?* it is shown that expenditures for education are not unreasonable. Nevertheless, an increasing caution among public school administrators is evident.

ARTICULATION OF SCHOOL UNITS

Questions of Adjustment.—The upward thrust of universal education which had reached the sixth grade in 1910 and which is, perhaps, almost at the tenth grade in 1929, is causing violent maladjustment in the senior high school and college. Here the almost irresistible pressure of the demand for "secondary" and "college" education for the masses impinges upon the almost immovable academic conception of what "secondary" and "college" educations are. If college and secondary educations are abstract and verbalistic exercises in mathematics, foreign languages, and sciences, with which only a fraction of the population can succeed, then the mass of humanity must be excluded or failed. If, on the other hand, all who wish continued education are to be accepted by secondary school and college, then what can be given to most of them must be quite different from conventional "secondary" and "college" educations.

Aspects of the Problem.—College administrators sometimes blame the public's high schools for not *excluding* or *failing* the less verbalistic children which the public sends to be *educated.* Academic and entrenched senior high school teachers scold the junior high school for not changing the biological inheritances of children by increasing their natural abstract intelligences, or for not driving out of school the many hundreds of thousands of normal children who are not interested in verbal formulas, but whose tax-paying parents insist that they be retained in school and educated. Eventually, the academic citadels will dissolve or explode. For the present, however, the problem of articulation of units is the most pressing and acute one before secondary school people. At present there seems to be no adequate solution for this conflict. The schools appear to be destined to muddle through while the aspirations of pupils and parents force continued adaptation or evasion in prescriptions, in method and content of the curriculum, and in school regimen. This is not to imply that many educators are not giving serious thought to the problems of secondary education. The seventh yearbook of the Department of Superintendence, *The Articulation of the Units of American Education,* published in February, 1929, followed the fifth and sixth yearbooks which dealt with the junior high school and the senior high school curricula, respectively. Another report on articulation is promised for the Ninth Yearbook to be published in 1931.

School Organization.—The "reorganized high schools" by which is meant all types of "junior high school," "senior high school," "six year high school" and variant reorganizations are nearly two thousand in number, estimated from data in *Bulletin*, 1927, no. 33, U. S Bureau of Education. There are now some 400 junior colleges, most of them public institutions, commonly connected with the senior high school. The proposed 6-4-4 organization, to include all pre-professional university training, is widely discussed. A most frequent stimulus to these reorganizations has been the need of better articulation. Whether the academic tradition is so strong that the problems will only be intensified and vocalized in the new institutions or whether actual solutions may be hastened after a period of recrimination between apologists for the old and the prophets of the new remains to be seen. At the present time, the advantage among school men seems to remain with inertia, but the democratic urge may rescue the reorganization before it is engulfed by conservatism. Congress has this year authorized the Bureau of Education to make a study of the organization, administration, financing, and work of secondary schools and of their articulation with elementary and higher education, at a total cost which is not to exceed $225,000.. Of this amount, the sum of $50,000 has been appropriated for the current fiscal year. Such a survey has great potentialities, if its leaders are men of vision and sociological insight.

COLLEGIATE EDUCATION

By Arthur J. Klein

Bureau of Education, Department of the Interior

COÖPERATION IN HIGHER EDUCATION

A most significant phase of higher educational activity during 1929 has been the progress made toward closer relations and better coöperation between various groups of higher institutions. This preoccupation with the problems of unity and articulation manifested itself: 1—In measures taken to adjust relationships between state-supported colleges and universities so as to provide a unified higher educational program to meet specific state needs and at the same time keep within the bounds of the financial abilities of the states; 2—In the studies of groups of institutions related to each other by common origins, support or control; 3—In a variety of developments that may for convenience be grouped under the term "professional higher educational standards"; 4—In studies of specific aspects of higher education made, not from the institutional, but from the activity standpoint and therefore cutting across institutional and state lines.

STATE SYSTEMS OF HIGHER EDUCATION

Problems of Adjustment.—For many years the multiplication of state-supported institutions of higher learning,—state universities, separate land-grant colleges, teachers colleges, normal schools, technical institutions, women's colleges,—was the rule. From this multiplication arose many problems of support and duplication of effort. The solution of these problems through some method of adjustment of the relationships between different state schools became a political as well as an educational problem. From the popular and political standpoint, desire for closer articulation arises largely from the belief that greater economy of expenditure may be secured, but from the educational standpoint, the most important consideration is a planned rather than an haphazard system of provision for higher educational training.

State Control of Institutions.—During the decade 1909-1919 state legislatures were especially active in changing and consolidating control of the state institutions by centralizing educational management, by restricting financial procedures to fewer and better defined channels or by creating fact-finding and fact-reporting bodies such as the Boards of Higher Curricula in Washington and Oregon. During the next ten years there was considerable tinkering with existing legal provisions of this kind and some new effort to secure economy and unity through state law, but on the whole the period until 1929 was devoted to observation and the acquisition of experience. In 1929 there seems to have been a revival of interest in these matters.

Unity Through State Law.—This renewed concern manifested itself in a variety of ways but its most significant expression in legal action was the law signed by the Governor of Oregon on March 1, 1929. The significance of this law lies primarily in the care taken to include and to safeguard the three factors that experimental trial seems to establish as essential to successful operation of laws intended to secure a unified state program of higher education. These three elements are: first, centralized control of state educational policy rather than of institutional administration; second, centralized fiscal control in the interest of maintenance of educational policy; and third, provision for impartial collection and reporting of facts as a guide to formulating of educational and fiscal policies. Failure to provide for one or the other of these three factors has in large part accounted for frictions and failures in past legislation. The provisions of the Oregon law with reference to these points are, therefore, of special interest and significance.

Operation of Oregon Law.—In order to provide for an agency of control that will formulate statewide educational policies rather than concern itself with institutional administrative functions or with the aggrandizement of specific institutions, the Oregon law abolishes the old Board of Higher Curricula and the boards of regents of the individual institutions. For these boards is substituted a new board consisting of nine directors appointed by the Governor with the approval of the Senate. Local or state political influence is guarded against by provisions that make the term of office nine years, that require notice and public hearing prior to removal by the Governor, that restrict the Governor's power of removal to not more than three members during a period of four years except for corrupt conduct in office, and that specify that no resident of a city in which any of the higher institutions is located nor more than one alumnus from the state university, the Agricultural College, or the normal schools, shall be a member of the board at any one time. Control of fiscal educational policy is secured by giving the Board authority to allocate to the institutions all funds made available for public higher education and by forbidding any official representing any of the separate institutions to appear before the Legislature or any of its committees except upon the written authority of the Board. In order to give the Board the initial factual basis and advice for formulation of the state's higher educational policy, the law provides for a survey by an impartial authority of all branches of state-supported higher education in Oregon. October 15, 1929, the Board voted to invite the United States Office of Education of the Department of the Interior to undertake this survey. Further continuous command of the facts necessary to guide the board in its decisions with reference to both educational and financial policies is insured by a provision of the law which authorizes the board to employ an executive secretary "fully qualified by educational training, ability and experience," to keep the members fully informed.

Montana.—Other attempts at adjustment of relations between state higher institutions, even in those states that have presumably set up machinery for common control, take for the most part the form of surveys and factual studies. Thus in Montana, which some years ago placed all its higher institutions under a single chancellor who exercises considerable power, the failure of the state to formulate a state program of educational finance made it necessary for the chancellor to carry on a special survey to determine the ability of the state to support the higher institutions. This survey was completed during the year and is illustrative of the disturbing and spasmodic attempts to evaluate the fiscal and educational situations that are made necessary by failure to provide for smooth and continuous adaptation of financial resources and educational development.

Kansas.—The higher institutions under one Board of Regents are to be surveyed again for the purpose of assisting the Regents to understand their problems and to guide them in their responsibility of administering the various institutions in their charge. Upon the invitation of the Board of Regents this survey will be undertaken by the United States Office of Education.

Arkansas.—There has been no unified control of the state higher institutions. Each has been under its own board. Nevertheless, the problem of their relationship and coördination has been recognized. The significance of this recognition lies primarily in the fact that it is given without the impetus of acute troublesome conflicts between the institutions, and further by the fact that the institutions themselves under the leadership of the Governor and the State Department of Education, have requested the United States Office of Education to make a survey as a guide to the state authorities and to the institutions themselves in formulating a unified state program of higher education. Other instances of similar attack by the states upon the problems of correlation between its institutions might be cited, but those given are sufficiently illustrative.

GROUPS OF INSTITUTIONS

Community of interest among institutions quite frequently crosses state lines. Thus we have groups of institutions tied together by varying degrees of sentiment or financial interdependence, attempting to determine the relationships that should exist between their own organizations or with reference to the common center of interest or control. This is illustrated on a National scale by the Survey of Land-Grant Colleges authorized by Congress upon the invitation of the Association of Land-Grant Colleges and Universities and conducted under the direction of the United States Office of Education.

Church Group Surveys.—Groups of institutions related by denominational or church allegiance and support are being brought increasingly under common study. Thus the Methodists have authorized during the year a very extensive and important survey of the institutions with Methodist affiliations. This survey will be under the direction of Professor Reeves, now of Chicago University. The Presbyterians are making a similar continuous study of their colleges under the direction of C. C. McCracken of Ohio State University. The study of Lutheran institutions, completed during the year under the direction of the late Professor Leonard, is another example of this type of investigation.

Public Schools.—Interest in unity and coördination manifested by studies and action with reference to the relationship of institutions has been emphasized upon a national scale in the somewhat more abstract field of theories of organization and articulation. The seventh *Yearbook* of the Department of Superintendence of the National Education Association which was published in 1929, was devoted to the articulation of the units of the American public school system. This was an attempt to define the problem of the relationships of the different levels of educational organization as a contribution to the correlation of educational activities from kindergarten to professional school. The results of this study of the relationships of different levels indicated quite clearly that such horizontal consideration of the problems failed to throw sufficient light upon the vertical relationships that cut across all levels of education—elementary, secondary, collegiate, technical, and professional.

Study of Education Relationships.—The commission of the Department of Superintendence was, therefore, continued and is planning a study for its next *Yearbook* which will consider such problems as those of promotion throughout the entire educational life of the individual; of the financial relationships between the elementary, secondary, and higher programs of education; and those of the relationships of education to the needs of the community upon all levels of training. A similar interest is manifest in the creation by the Secretary of the Interior in the spring of 1929 of a national commission on the relationships of the Federal Government to education. This commission is made up of educators recognized as leaders in their fields. Its interests lie not alone in the relationship of the Federal Government to the operating educational agencies but also in the relationship of public higher institutions to private ones and of higher institutions to the public school system. All these relationships are affected by Federal activities.

PROFESSIONAL UNITY

Higher Education Standards.—Quite apart from organization relationships with which the preceding discussion has been concerned, the year has been marked by a continuance and an accentuation of interest in what may be called the professional standards of higher education. Thus study of the improvement of college teaching has been continued and the National Society of College Teachers of Education has contributed an interesting study on current educational adjustments in higher institutions which deals in large part with efforts to improve teaching.

New Journal of Higher Education.—It is a curious fact that in spite of the keen interest in higher education in the United States and the great number of voluntary and official agencies created as by-products of these interests, there has never been a journal which represented the field of higher education as a unit. It would seem that there is a field for such a publication in view of the fact that almost 70,000 men and women are engaged in college and professional teaching and administration. It is significant, therefore, that in December, 1929, the Ohio State University will undertake the publication of *The Journal of Higher Education.*

Bibliography.—Of importance also, as marking the drawing together of scattered interest in various problems of higher education, is the consolidation of information about the work that has been done in the field of serious study of higher educational problems and standards. Professor Carter V. Good of Chicago University has written and published within the year a comprehensive survey of the problems and literature of higher education under the somewhat misleading title, *Teaching in College and University.* Such initial bibliographical compilations quite frequently mark considerable advancement in definition and development of areas of unified interest. Certainly to those who believe that higher education has not developed an extensive professional literature, this bibliography will be a revelation.

SPECIFIC FIELDS OF ACTIVITY

Subject Matter Fields.—It has, of course, been true that, for a long while, the professional relationships of the men engaged in specific subject matter work in the colleges has been closer and has represented a larger degree of common interest than has the relationship of the specific subject matter field to other fields in the institutional organization. Thus the engineers, the modern language teacher, and history teacher, have had their professional associations devoted to the promotion of the welfare of specific fields without reference to institutional, state or regional lines. The community of interest that rests upon common subject matter fields has extended to other higher educational activities.

Educational and Financial Data.—During the past year further emphasis has been placed upon some of the non-academic concerns that affect colleges and universities as a group. Thus the Association of American Colleges and the Council of Church Boards of Education have created a joint committee under the leadership of President Cowling of Carleton College, to devise methods of preparing forms of record and report that will make comparable information derived from individual institutions with reference to educational statistics and financial data. The Office of Education has also during 1929 formed a national committee composed of the representatives of the three associations of business officers that represent the Southern, Western and Eastern regions for much the same purpose, although its activities will be confined largely to agreement upon definitions to control forms of higher educational accounting and financial reports made to the Federal Government or other statistical collecting agencies. The proposal that these two committees shall consolidate their work and in effect work as one committee is now receiving consideration.

College Athletics.—Although of very different character, the report of the Carnegie Investigation of Athletics in the colleges and universities in the United States which appeared in October, represents an attempt to attack the problems of college athletics as a national problem of education. The necessity for this viewpoint seems fairly obvious. An individual institution's problem of control of athletic situations is immensely complicated by the general practice and general tone that prevails regionally and nationally. It is only by creating attitudes of mind and standards of universal practice that the athletic situation can be clarified and necessary measures taken to place it upon a plane suitable to higher educational institutions.

CONCLUSION

The danger of these attempts to unify control, financing, educational standards, accounting procedures, and professional attitudes lies, of course, in the possibility that a living, human means for maintaining and promoting individual and social happiness may be so largely mechanized that the machine process view of education will tend to smother the living elements of initiative and innovation on the part of individual institutions. However, there seems to be little danger of such devitalizing of our higher educational system by the current interest in correlation. The apparent emphasis upon faith in charted courses and prediction curves is less important than it appears in view of the fact that never have organized educational groups so insistently urged new experimentation and provision for individual variation from the channels in which the majority of the people seek their educational level. Probably the prevailing higher educational attitude that has manifested itself during 1929 may be described as that of increasing reliance upon diverse institutional character to attain educational harmony.

EDUCATION FOR THE PROFESSIONS

By Ambrose L. Suhrie *

Professor, New York University

The callings which may properly be included in a comprehensive list of the professions are many and the number is steadily and rapidly increasing. It is possible here to present but a brief report of the significant developments of the year in only a few of the principal types of professional education.

LEGAL EDUCATION

Standards of Supervising Agencies.—At the annual meeting of the American Bar Association, held in Memphis, October, 1929, the standards recommended in 1921 and 1927 were reaffirmed by a decisive majority. The Association also adopted a resolution directed against commercialism in legal education. This latter action ratified a similarly phrased standard that had been recommended by the Washington Conference on Legal Education, in February, 1922, and adopted by the Association of American Law Schools in December, 1922, and by the American Bar Association's own Council on Legal Education in April, 1928. The Association of American Law Schools, at its annual meeting held in Chicago, December, 1928, made no change in its virtually identical set of standards.

Bar Admission Requirements.—The states continue to respond slowly to the recommendations of the American Bar Association. The standard most warmly discussed is that requiring two years of college work, or its equivalent, before the beginning of the period of law study. During the past year the number of jurisdictions that have adopted this requirement for all applicants has been increased from 5 to 6 (to Colorado, Illinois, Kansas, New York, Ohio, add Minnesota). Michigan has instituted a similar requirement, subject to a very few exceptions in the case of special students in local law schools. The number of states that have a similar requirement for law school but not for law office applicants has risen from 2 to 3 (to Wisconsin and Wyoming, add Connecticut). Finally, two states continue to have a similar requirement that need not be satisfied until the applicant takes his bar examination (Montana and West Virginia). On the other hand, California, one of a group of thirteen states that do not require any specific evidence of general education, has recently enacted legislation designed to prevent any increase in standards. New York has abolished the exemption from an office clerkship which college graduates had previously enjoyed, and has strengthened and clarified its rules in this and in other particulars.

Law School Statistics.—In 1928-29 the degree-conferring law schools in the United States numbered 173, of which 78 were full-time, 74 part-time, and 21 of the "mixed" type, maintaining separate full-time and part-time divisions. As compared with the year before, there were one additional full-time school, five fewer exclusively part-time schools, and one additional school of the "mixed" type. The autumn attendance at each group (including latest available figures for schools not yet reporting) was as follows: Full-time, 15,129 (a gain of 62 over the year before); part-time, 16,919 (a gain of 22); "mixed" type, 15,447 (a gain of 420); total for all schools, 47,495 (a gain of 504). At the close of the academic year, 56 of the full-time schools (72 per cent) were members of the Association of American Law Schools, and these, with 5 others (making 78 per cent), had been approved by the Council on Legal Education as complying with the standards of the American Bar Association. No exclusively part-time school had qualified under the standards of either Association, but five of the "mixed" type were members of the Association of American Law Schools, and these, with one other, had been approved by the Council on Legal Education. Schools approved by the Council contained 86 per cent of the exclusively full-time attendance, 15 per cent of the attendance at schools of the "mixed" type, and 32½ per cent of the total attendance at all law schools.

---

* Note: The author is indebted for significant contributions to the material presented in the several sections of this article to the following persons: Legal Education, Alfred Z. Reed; Medical Education, Fred C. Zapffe; Engineering Education, H. P. Hammond.

Research and Law Reform.—Such changes as have recently occurred in the curriculum and methods of law schools have for the most part been incident to a growing appreciation of the importance of research activities leading to law reform. These are variously described as "investigation of the problems of legal adjustment and how to meet them effectively," as "an understanding of the economic, social and political problems with which the law deals," as "shaping the law to meet the demands of a changing society," and as "social engineering." There is some disagreement as to whether they can best be organized independently of, or in conjunction with, particular law schools; and, in the latter case, whether they should be regarded as constituting one of two principal and coördinate functions of the law school, or should be explicitly subordinated to its traditional purpose of training practitioners. Examples of recently established independent organizations are the American Law Institute, which during the year has continued its two tasks of restating the common law and of drafting a model Code of Criminal Pro cedure; and the Johns Hopkins In stitute of Law, which, in addition t publishing a useful directory of th work now being done in the variou fields of legal inquiry, has launche several concrete investigations of it own. Examples of law schools tha not only conduct surveys and studie of particular social problems, but per mit activities of this sort to be of fered, under certain restrictions, in partial satisfaction of requirements for their first law degree, are Colum bia and Yale; the latter has also representatives of the Graduate School the professional schools of Medicine and of Law, and teachers of the social sciences and the natural sciences in the College. The Harvard Law School has recently established, in addition to its general program of study and research for graduate degrees, Institutes of Criminal Law and of Comparative Law, but pursues a more conservative policy as to the extent to which participation in such activities may be credited toward its first or professional law degree.

MEDICAL EDUCATION

Modifications in the Curriculum.—There is no indication of significant change in the number of students enrolled in Medical Schools or of the number of medical school graduates admitted to practice in 1929 as against 1928. In recent years such agencies as the American Medical Association and the Association of American Medical Colleges have actively encouraged individual medical schools to undertake significant innovations in the selection and sequence of subject matter units and in the methods of instruction in medical schools and to record and report results. These experiments are usually conceived by the individual medical school and are submitted to the Association of American Medical Colleges for approval and endorsement. The following typical innovations have been undertaken during the year: abrogation of attendance records by Western Reserve University Medical School; reduction of the total number of hours in the medical curriculum far below the minimum heretofore set down by Johns Hopkins Medical School; provision for much free time for medical students to read, research, or spend their time on studies of their own choice; elimination of all but strictly clinical work from the fourth year of study; the institution of supervised clinical clerkships during which time no other curricular activity makes any demands on the student's time; a shifting of the subjects in the curriculum so that anatomy continues throughout the four years; clinical teaching is begun in the first year; and all so-called pre-clinical subjects are continued throughout the whole four years by means of a proper correlation of subjects.

Changes in Method of Licensure.—The state medical examining boards have turned over to the Association of American Medical Colleges full responsibility for regulating medical schools and medical education. These boards will henceforth make no regulations binding upon medical schools as a condition of the admittance of their graduates to examinations for state licenses to practice medicine. In other words the schools will be free to determine their own standards and practices and the state examining board in any given instance will merely pass upon the product.

ENGINEERING EDUCATION

Enrollment.—After a nearly static condition for five years, enrollment in engineering colleges has shown a gain for the year 1928-29. While statistics for the year are not complete, a tabulation of enrollment in sixty-two representative institutions showed a gain of slightly more than 5%. This would represent a total gain from approximately 65,000 in 1927-28 to approximately 68,500 in 1928-29. Enrollment in the upper two years showed a greater gain than in the lower two years, caused by increasing numbers of transfers from junior colleges and other collegiate institutions. In several institutions the numbers of engineering students actually increased from the freshman to the senior year. This has caused a gain in the number of graduates out of proportion to that for total enrollments. There has been some abatement of the pronounced trend toward high enrollment in electrical engineering and a shifting from that division to mechanical, civil and chemical engineering. Enrollment of graduate students continues to increase and is one of the most significant developments in engineering education of late years.

Investigation of Engineering Education.—During the year the Society for the Promotion of Engineering Education completed its five-year investigation of engineering education. As a result of this survey sixteen separately bound bulletins and three reports have been published. These will be consolidated into two volumes, soon to be available. The two volumes will give the essential data and findings of the investigation. One division of this survey was devoted to noncollege technological institutions, a division of engineering education to which little thought or attention has been devoted in this country. The survey finds that this type of institution should have a more extended development in the United States. The completion of this comprehensive survey is one of the mile-posts in the progress of engineering education. It is both a factual survey and a series of recommendations by the Board of Investigation and Coördination, with relation to the more important problems confronting engineering colleges. Upon completion of the survey, Director W. E. Wickenden has assumed the presidency of the Case School of Applied Science. H. P. Hammond, Associate Director, resumes his duties as Professor of Civil Engineering at the Polytechnic Institute of Brooklyn, and continues in charge of the Society's Summer School for Engineering Teachers.

Summer School for Teachers of Engineering.—The Society's Summer School for Engineering Teachers continued with one session on mechanical engineering at Purdue University during June and July of 1929. This session was attended by ninety teachers from sixty institutions in all parts of the country. The staff comprised fifty individuals drawn from the teaching staffs of colleges and from the ranks of practicing engineering industrialists. The session was the largest which the Society has held since the establishment of the Schools in 1927 and was eminently successful. Part of the program was devoted to the study of the basic problems of teaching, part to the discussion of particular aspects of the teaching of mechanical engineering, and part to the study of related problems of industry. A feature of the program was a trip by the entire party to the plant of the Western Electric Company at Hawthorne, Ill., where methods of production and administration of a large industrial establishment were studied.

Personnel Practices.—One of the significant developments in engineering education is the increased attention being given by the colleges to the personal problems and adjustments of students. This is evidenced in some institutions by the appointment of personnel directors, student advisers, etc., and in other institutions by an awakening interest on the part of members of the faculty in these problems.

Economics of Engineering.—Another significant trend is the increased attention being given by a number of institutions to instruction in economics as related to engineering practices. Practically all of the engineering curricula now require a course in general economics, this subject commonly being taught by the department of economics of the college. In addition to this course, a number of institutions have recently installed a course in the economics of engineering taught by a member of the engineering faculty. As a reflection of this increased attention to economic problems, Professor J. C. L. Fish, of Stanford University, has organized a clearing house through which teachers of economics may exchange methods, problems and examinations, and thus keep in touch with the more recent developments in the field. The trend toward increased attention to economics in engineering curricula is a reflection of the increasing economic responsibilities of engineers in practice, and is attributable in part to the results and recommendations of the survey of engineering education.

Demand for Graduates.—Colleges throughout the country report a very heavy demand for graduates of engineering, and in most instances, lack of sufficient graduates to meet the demand. In many colleges members of the graduating class are offered from three to four positions some months before graduation. There seems no indication of an abatement of this demand with which engineering enrollment is not keeping pace.

Engineering Buildings.—During the year a number of notable additions were made to the physical plans of engineering colleges;—at Drexel Institute, Pennsylvania State College, West Virginia University, University of Maine, Lafayette College, and Lehigh University. Among these, the Packer Laboratory of Mechanical and Electrical Engineering at Lehigh, is one of the most notable additions to the physical facilities of engineering education.

PROFESSIONAL EDUCATION OF TEACHERS

Enrollments in Teacher-training Institutions.—In many sections of the country where there is and has been for some time a surplus of legally qualified teachers a policy of restricting enrollments in Public State and Municipal Teacher-training Institutions has been put into operation. The total enrollment of students in public teacher-training institutions has as a consequence dropped, but it is doubtful whether the surplus of trained teachers has as yet affected adversely the enrollment in the "teachers classes" in private colleges.

The In-service Training of Teachers.—The presence of a surplus of novitiates waiting for appointment has made it possible for boards of education to require additional in-service training of teachers already employed, and so there has in some places been a marked increase in the number of teachers engaged in "extension class" and summer school study. It is estimated that more than 13,000 teachers in the employ of the New York Board of Education have this year been required to pursue additional professional study as a condition of advancement in salary. And in the country at large increasing thousands of teachers have voluntarily chosen to pursue additional training for their profession.

Certification.—Because of the surplus of teachers who have acquired "standard minimum professional training" there is a marked tendency to shorten the life of many forms of provisional or "emergency" certification and to grant permanent or life certification only to persons who have had a considerable period of successful experience in teaching and distinctly super-standard professional education.

Selective Admission.—There has been a marked tendency to increase the standards of requirement for admission to teacher-training institutions and to limit the number to be admitted in any one year. In many institutions only one half or one third or in some instances one fourth or one sixth of the number of high school graduates applying are admitted. Mere scholastic achievement in high school is no longer the sole criterion of qualifications. Such matters as health, social background, emotional stability, intelligence and aptitude for teaching are taken into account. In many states superintendents and high school authorities share responsibility with officers of the teachers college and normal school for the selection of young persons believed to be most promising.

Program of American Association of Teachers Colleges.—The program of the annual meeting of the Association in Cleveland in February was devoted almost entirely to a forecast of the standards of teacher training institutions in 1950. It was not inappropriately called a program of prophecy.

Regional Conference on Teacher Training.—The Fourth Annual Conference of Normal Schools and Teachers Colleges of the East was held in New York City in April. This conference was attended by approximately 3,000 different officers, teachers and students representative of teacher-training institutions from Alabama to Maine. A unique feature was the full participation of students in the conference. *Problems in Teacher-training*, Volume IV, a report of 400 pages, gives in detail the proceedings of this conference. Other regional conferences are being planned for the immediate future.

Report of the Committee on Articulation of Teacher Training Institutions.—A representative committee of teacher-training experts under the chairmanship of Dean John W. Withers of the School of Education, New York University, made a significant preliminary study of the subject of "articulation in the Field of Teacher Training" in the United States, which study was printed in the seventh *Year Book* of the Department of Superintendence and discussed in the Cleveland meeting of the Department in February. The following principles to govern the articulation of teacher-training institutions and agencies with other units of our educational system were agreed upon and developed in the report: 1. The principle of liberty; 2. The principle of equality; 3. The principle of fraternity or voluntary coöperation; 4. The principle of standardization; 5. The principle of adaptation; and 6. The principle of economy and efficiency.

It was further agreed that these principles of articulation when fully applied to the agencies for professional education of teachers will require full realization of the following aims:

1. To maintain an optimum relation between the pre-service and the in-service program for the education of teachers.
2. To secure the relationship between the formal and participating factors in teacher training that will be most stimulating and encouraging to continuous growth of (a) the teachers, (b) the faculty of the teacher-training agency, and (c) the field force of principals, supervisors, and superintendents.
3. To keep the teacher-training faculty in touch with the vital problems to be faced by their graduates while teaching.
4. To keep the school superintendents, supervisors, and principles acquainted with the spirit and aims of the teacher-

training faculty that supplies their needs.
5. To eliminate unnecessary, confusing, and wasteful effort in teacher-training by promoting satisfactory teamwork between the forces responsible for the pre-service and the in-service phases of such training and establishing the feeling that the total task must be a shared responsibility of both faculty and field force.
6. To deal more effectively with the problems of time allotment, placement, and relative emphasis in curriculum material in the teacher-training program.
7. To influence the proper guidance of teachers in their development, and to assist them to an adequate understanding of types of work involved and the cultural and professional qualities required for each type.
8. To anticipate impending changes in the school system served and to provide for these changes in advance so that desirable new undertakings can be made immediately effective.

VOCATIONAL EDUCATION

By Charles R. Allen

Editor and Educational Consultant, Federal Board for Vocational Education

THE SOCIAL FUNCTION OF VOCATIONAL EDUCATION

Points of View.—The function of educational enterprise can be regarded from two distinct points of view. Its value is determined, first, by the degree to which individuals profit as individuals and second, by the return made to the community in terms of greater ability of its members. The first point of view has had the wider acceptance in the past. The appeal to get education or more education has been very largely based on the appeal to the individual's ambition to better himself. The second conception has recently been receiving greater consideration, particularly with regard to the expenditure of public funds for educational purposes. This has not only affected the conception of the function of all education, but has begun to affect and clarify the thinking of those concerned with vocational education, especially as carried on under public control and paid for by public funds. If the purpose of vocational education is to increase productive knowledge and skill, it then becomes evident that the efficiency of any program is, theoretically at least, measurable in terms of the degree to which such knowledge and skill is returned to the community in the form of service. Fortunately, the two points of view are not incompatible.

Some Misconceptions.—Perhaps the most serious misconception of the special social function of vocational education is the notion that—an occupation does not require the same degree of intelligence as does scholarship or culture. This has led in many cases to a feeling that vocational work should be provided for those considered to have a relatively low mentality, and in some cases has seriously interfered with the securing of student groups properly equipped to profit by the institution. A second misconception arises from a confusion between motivated courses in general education and vocational education as such. A third has been due to a confusion between the social function of vocational guidance and that of education. Guidance aims at assisting an individual to find out what he can best do. Education concerns itself with assisting him to secure the necessary training to do that thing well. A fourth misconception has been a confusion between what a college degree represents in terms of culture or of general education and what is represented by participating occupational experience. This confusion has in some cases led to difficulties in the employment and qualifications of teachers.

EFFICIENCY AND SPECIALIZATION

Rating Factors.—Increasing recognition of the responsibility of those charged with the operating and developing of vocational programs has led to definite attempts to measure the efficiency of such programs. The general procedure, thus far developed, has consisted in setting up certain factors and in rating the program or the specific course upon those factors which have differed quite distinctly from those used in the ordinary type of a general educational survey. In the case of any vocational course it is evident that the return to the community will be diminished in proportion as the attempt is made to give training to individuals whose special aptitudes, abilities, and mental capacities are such that they cannot actually grasp the training in usable form. It is also evident that if the content which is taught does not properly function in the occupation to that extent, the program is not returning to the community what it should return. It is equally true that if an unqualified teacher is employed that teacher will be unable to function in a satisfactory manner. Moreover, even if all the above factors are met, if, as a matter of fact, those individuals who have successfully pursued the training do not actually enter the occupation for which they have been trained, the work is a total loss in its value to the community. Definite groups of rating factors have been developed and applied to some extent in the attempt approximately to determine the probability of adequate community returns for the time, money, and energy expended. The results so far have indicated a distinct value from the use of such procedures in improving vocational programs.

Occupational Spread.—Vocational education has been defined in an offhand way as any form of education which assists an individual to get a job, hold a job, or get a better job. It will function socially in proportion as it assists individuals, according to their specific needs, to secure educational mastery of all the occupations followed in the community or the state, and is not confined to certain selected groups of occupations. In the field of vocational education this conception has been constantly growing, and has resulted in a steady increase of what may be called occupational spread. Ten or fifteen years ago the giving of vocational training in such subjects as coal mining, oil production, beauty parlor work, baking, and a variety of other occupations was not thought of. It is now also recognized that productive occupations are rapidly breaking down into specialized lines of work and that this increase in specialization must be recognized in the development of programs of vocational education.

Shift from Manual to Technical Skill.—One interesting result of this increase in specialization has been a reduction in the requirements for manual skill and the corresponding increase in the amount and character of the specific knowledge required. Homemaking, for example, has largely ceased to be a manipulative occupation. The practice of that occupation to-day consists to a much greater extent than formerly in the utilization of labor-saving devices, the problems of buying rather than making, and the ability to deal with situations of a personal character, thus requiring a greater degree of technical knowledge but a less degree of manipulative skill. This situation has unquestionably brought about a corresponding change in the content of programs of vocational education. The content must still be specific, but is becoming increasingly technical rather than manipulative.

Shift from Operative to Managerial Jobs.—The emphasis laid upon technical ability of a specific character has found its corrolary in an increasing emphasis laid upon managerial rather than operative ability. This has shown itself most strongly in the fields of home economics, agriculture, trade and industry. Agricultural education of less than college grade at the present time aims almost exclusively at training which functions in the ability to manage an agricultural enterprise. In home economics this same tendency has appeared strongly in the broadening of the program to cover budget making, child management, home management, and other problems of that general character, whereas in the earlier stages of the program attention was concentrated almost entirely upon operating jobs, such as those involved in cooking and clothing construction.

GROUPS SERVED BY VOCATIONAL EDUCATION

Classification.—According to current thought provision should be made for service to at least three groups: First, the preëmployment group of young people who are looking forward to employment but who are able to give their full time to education; second, the learner group, consisting of individuals who have already entered into employment, but with the status of a learner; third, the adult employed group who are giving their chief time to employment, but give a portion of their leisure to education.

The Adult Group.—Traditionally in this country education at public expense has been largely regarded as only for young people. The youth who left school and went to work was considered as having had his chance. Even to-day there is an undesirable concentration upon the relatively small group who remain in the full-time school and complete the work in high school or college. This same point of view has tended to keep up the idea that the adult citizen, although he supports the public schools, is not entitled to any service therefrom. In the eyes of many progressive educators this situation has meant a discrimination between groups entitled to service. One gratifying trend has been the breaking down of this idea as represented by the increased willingness of states and local communities to provide forms of education suited to the needs of young people who have gone to work and to provide a similar opportunity for the adult citizen. The development of part-time continuation schools, in many cases authorized by state law, frequently with compulsory attendance, is one sign of this changing conception, and the rapidly extending development of evening educational work for adults is another. Contemporary thought is swinging around to a position where only two groups are recognized—employed and unemployed. One of the foremost leaders in the field of part-time education takes the position that young employed people are essentially adults, as shown by their reactions and points of view. This tendency to reduce or remove a discriminatory use of public funds is of great importance because it represents a definite movement toward providing educational opportunity for all citizens. This has created a number of problems with regard to types of organization and character of content and objectives, which differ more or less from similar problems as they have been attached and worked out in the field of the regular full-time education, both vocational and general. In the case of employed adults it has been found that the efficient type of organization is one which permits of admission at any time and which is based largely on individual courses of instruction worked out with special regard to individual needs. It may be interesting to note that one endowed institution in this country, out of a total yearly registration of between four and five thousand students, has found it possible to provide individual progression and instruction for a large percentage of its students. Another interesting development results from the injection of the adult into the field of education and has come from the fact that, in general, adults constitute an uncontrollable group in the sense that they cannot be made to go to school. The bringing of the adult into the range of educational work has made necessary more careful consideration of the importance of functioning content, the development of more efficient methods for the development of such content, and for the setting up of functioning objectives. This has been particularly true in vocational education.

Unemployed Groups.—The need in this connection has been met in general by the establishment of preemployment training courses of varied length and varying degrees of training. It is now held, however, that any vocational course which does not equip an individual sufficiently to enable him to become an asset to an employer or who can meet at least minimum employment levels in the occupation in which he is trained, is of no social value to the community that supports it. The application of this principle has perhaps caused the greatest difficulty with regard to the combination of vocational programs with general education programs in high schools, particularly in the field of trade and industrial education. On the part of many experts in this field there is grave doubt whether, in the case of many occupations attempted, it is possible to give adequate training up to at least a minimum level of employment in the occupations which are represented in the programs, and at the same time secure an amount of general education roughly represented by the ability to meet college entrance requirements. Evidently the vocational school which does not attempt to accomplish both objectives is in a much more advantageous position with regard to this matter. In the attempt adequately to serve these various groups certain type organizations have been developed to meet varying working conditions and needs.

SERVICE ORGANIZATION

Types.—General education has found necessary the development of a few standard types of organization, elementary school, high school, college. These may be regarded as the standardized agencies for general education. The widely different conditions existing in vocational education have made necessary the development of a number of types of organization, in order effectively to meet the needs of youth and adult. Among the more important are: 1. the vocational course incorporated into a high school program; 2. the vocational school set up as an independent administrative unit; 3. the part-time continuation school; 4. the evening extension school, and 5. the correspondence school.

High School Vocational Work.—The course in the high school allots a certain amount of time to vocational work, such work being given credit value for a diploma. It is fitted into the schedule of these schools, and is treated on a par with other subjects. Such courses may or may not be combined with the requirement that a certain amount of supervised practical work shall be done outside of the school. This requirement is very general in the case of home economics and is required in agricultural vocational education where such work is Federally aided.

The separate vocational school is free from the necessity of making its schedule conform to that of the regular high school, hence there is more elasticity with regard to the time of admission, time allotments to shop work or technical subjects, and these schools usually give a much larger proportion of time to vocational work than is true of the vocational courses in high schools.

Evening Courses.—In the case of work for adults it has been found necessary to provide for a high degree of flexibility, particularly with regard to the length of specific courses. Since adults come into evening courses with all sorts of needs and all sorts of assets, this situation has created a very serious problem of adapting work to needs. Obviously, the shorter the course and the more specific the content, the better opportunity to find a group whose needs will be reached to the maximum degree. This is the essential purpose achieved by the short-unit course. These units have sometimes been as short as four to six hours, at the end of which time the students were discharged. Where evening courses are operated for a period of time, it is customary to offer a whole series of short-unit courses on what has been called the "cafeteria" basis, so that students who have completed one short-unit course may immediately enroll for some other unit, thereby filling a variety of needs.

The part-time continuation school is that type of organization intended to meet the needs of young persons who are employed by giving them an opportunity to attend school for a certain number of hours per week during the working day. In a considerable number of states attendance at such schools is compulsory, and in a number of other states voluntary. In addition to the general types of organization briefly described above, each field of vocational education has set up certain adaptations of these general types to meet the situation as it exists in that particular field.

VOCATIONAL EDUCATION LEGISLATION

Boards of Control.—Vocational education of secondary grade under public control is nearly all affected by Federal and state legislation and state plans complementary to the Federal acts. The Federal acts which are fundamentally important are the National Vocational Education Act, passed in 1917, and several acts complementary thereto, of which the chief is the George-Reed Act enacted by the last Congress. The intent of Congress in passing the National Vocational Education Act was unquestionably to secure a vocational education program of less than college grade that would function. Congress took into account the history of the preceding 25 or 30 years during which numerous attempts at providing vocational education of this type had not been successful. It was believed by the proponents of the Act of 1917 that it was fundamentally necessary in vocational education that the parties whose interests are affected should be represented in the control. Hence the Act establishes a board in which representation of agriculture, general education, labor, and commerce is insured. In the case of many states and in local communities this same principle has been used in boards of control. The opinion as to the extreme importance of representation in control is generally held by students of vocational education. In the case of many educators, whose work lies outside of that field, there is a belief that such representation is not necessary on boards of control, but that the development of an educational program can safely be entrusted to the regular school or to the professional educators whose major responsibilities lie in the field of general education.

National Vocational Education Act.—The National Vocational Education Act, also known as the Smith-Hughes Act, provides funds aggregating at the present time $7,000,000, for the purpose of encouraging the states in the development of programs of education in agriculture, home economics, trade and industry. Of this amount $1,000,000 is specifically appropriated for the encouragement of training of more competent teachers. There is also provided an appropriation of approximately $200,000 for administration, research, and studies to be made by the Federal Board for Vocational Education.

George-Reed Act.—This Act provides additional funds for the purpose of aiding the states in further developing vocational programs of less than college grade in agriculture and in home economics. It provides for an initial appropriation of $500,000, and for each year thereafter, for four years, a sum exceeding by $500,000 the sum appropriated for each preceding year, so that by the end of the four years this appropriation will amount to $2,500,000. One-half of the appropriation is allotted to the states and territories in the proportion that their farm population bears to the total farm population of the United States, exclusive of the insular possessions, according to the last United States census preceding the end of the fiscal year in which any such allotment is to be made, and is to be used for the salaries of teachers, supervisors, and directors of agricultural subjects in such states and territories. The remaining half of the sum appropriated each year is allotted to the states and territories in the proportion that their rural population bears to the total rural population of the United States, exclusive of the insular possessions, according to the last preceding United States census, and is to be used in the same manner as in the case of agriculture. This Act also provides the sum of $100,000 annually to be expended by the Federal Board for Vocational Education for the same general purposes as the appropriation of $100,000 made under the National Vocational Education Act. From the standpoint of Federally aided, publicly controlled vocational education, it is evident that this Act very greatly increases the possibility of developing programs of vocational education in agriculture and home economics in the states, and also makes it possible for the Federal Board for Vocational Education to discharge its responsibilities in a broader and more satisfactory manner. It has enabled a considerable increase in the staff of the Board through the employment of certain research specialists as well as of special agents.

PUBLIC VOCATIONAL EDUCATION DEVELOPMENT

Scope of Federal Aid.—A survey of the entire program of vocational education in this country would include much that is not Federally aided. The professional schools, colleges, universities, and correspondence schools, represent a large field in vocational education. Some phases of vocational education are carried on under public school auspices, but are not Federally aided because they do not conform to the requirements of the state plans. Again, in certain states a greater or lesser proportion of the program, while meeting the requirements of the state plan, under the state policy receives no Federal aid. Federally aided vocational education, therefore, would only include the work of the agricultural and mechanical colleges, of which there are some 51 in the country, and the work of less than college grade carried on under the provisions of the National Vocational Education Act and the George-Reed Act.

Enrollment.—The George-Reed Act has been too recently enacted to show very much effect in the development of programs of vocational education. The work carried on under the Smith-Hughes Act has steadily developed since its inception in 1917. At the present time it is safe to say that during the last year there were enrolled in Federally aided schools and classes giving vocational education of less than college grade over 1,000,000 individuals, of which a very considerable proportion were employed.

Use of Public Funds.—From the financial side, there was expended from state, Federal, and local funds an estimated amount of over $30,000,000, of which the Federal Government contributed $6,000,000, or approximately 20 per cent. This amount constitutes only about 2½ per cent of the total amount of money expended from public funds for all forms of education. If we exclude from the entire sum spent for education an estimated amount for the elementary schools, we still find that the great majority of public funds are still being expended for those who remain in the high school and college and but relatively a very small amount is expended for the benefit of those who work.

AGRICULTURAL EDUCATION

Organization Types.—The type organization in agriculture is the vocational course in the rural high school, giving from 90 minutes a day up to vocational instruction in agriculture of a character closely related to the local agricultural enterprise. Connected with these courses is a requirement for supervised project work and practice work on the farm, and in some cases a considerable portion of the time allotted to vocational agriculture is given to work related to this form of project and practice work. The part-time type of organization is now being developed especially to meet the needs of farm boys who have left the regular school. It is frequently so organized that these boys can attend special courses in agriculture for a considerable amount of time per day during the winter or during that part of the year when there is little demand for work on the farm. Evening classes of the typical extension type are also utilized for the benefit of adult farmers.

Rural High Schools.—The effect of the George-Reed Act will be primarily to increase the extent of agricultural education of less than college grade.

This type of education is centered almost entirely in small rural high schools. At the present time about 3700 of these schools out of over 11,000 include a program of vocational agricultural education in the educational service which they offer. The additional funds provided under the Act will enable the number of these schools to be greatly increased, and since they represent practically the only educational opportunity available to young people in these communities, the result will be a greatly increased benefit to the country at large.

TRADE AND INDUSTRIAL EDUCATION

Part-time Courses.—Trade and industrial education has found it necessary or desirable to utilize a wider variety of organization than has been true of either home economics or agriculture. The typical vocational course in the high school, the evening trade extension course, and the continuation school have all been utilized, but, in addition, there have been developed certain types of organizations. Among the more important of which are the part-time coöperative and the opportunity type, together with what is known as the organization for "in and outers." The part-time coöperative organization is usually used in connection with an apprenticeship program. It consists essentially in "splitting" the vocational training between the school and the occupation, the work being given in the school dealing usually with related subjects, such as drawing, science, and mathematics, the actual manipulative training and a certain portion of the immediately related technical knowledge being secured in the occupation itself.

The opportunity school practically undertakes to give any individual anything that he wants along vocational training lines, whenever he comes and asks for it, whereas the "in and outer" organization does practically the same thing but deals almost entirely with employed people who by virtue of seasonal conditions or for other reasons find themselves out of work during certain period of the year and desire to utilize that time to secure further training in the practice of their occupation.

JUVENILE EMPLOYMENT FOR GIRLS

The situation as to the employment of young girls is creating a special problem. Opportunities for employment for girls 14 to 16 have been steadily decreasing. This fact has had a tendency to throw back into the full-time school an increasing number who in years past left the full-time school and went to work. There are now in process of development special programs intended to meet the needs of this group. They have taken the form of what is essentially the opportunity school type of organization. Under this organization the older portion of this age group have an opportunity to secure training for such jobs as they can secure at any given time and a placement service is established to assist in securing such work. Many of these jobs are seasonal or casual, so that when the young worker is laid off she can return to the school and secure training for some other casual job. They might include such occupations as addressing, making up novelties, or special forms of needle work. A chart of employment opportunities and seasonal demands has been worked out, on which the program is based, and classes are sometimes made up from applicants at the placement bureaus. Only in relatively skilled trades is an attempt made to utilize the time between 14 and 16 in giving some pre-employment training for the occupation which the student expects to follow. While programs of this type are by no means universal in this country, at the present time their development is significant of a movement which will undoubtedly gain in strength as time goes on and as opportunities for juvenile employment become more restricted.

HOME ECONOMICS

Courses.—The type organization in home economics is represented by courses included in the schedule of the high school. These courses usually carry diploma credit. Such courses are frequently but not always connected with definitely planned work in the home carried on under the supervision of the teacher. Evening classes for adult women are carried on largely by the utilization of short-unit courses. Home economics frequently forms a portion of the program of continuation schools as well.

General Trends.—Two general trends which have been commented upon in previous editions of THE AMERICAN YEAR BOOK appear to have continued in the field of home economics. The first has been an increasing tendency to base what is taught upon the known needs of women and girls in the home, as determined by the application of the principles of occupational analysis. A second trend has been an increasing emphasis and extension of the program into the field of management of the home. This tendency has perhaps been most marked in the case of evening classes for adult women, and has shown itself in the extension of the program in the management field rather than in a reduction of the work given in what may be called the operative side of home making. The offering of such courses as child care, budget making, and economical buying are examples of the trend toward recognition of that part of the work of the woman in the home, managerial in character. Through the work of committees and other agencies there appears to be developing a much closer agreement among those concerned in the work as to what may properly be included in the range of home economics teaching, and as to what should be regarded as pertinent to some other form of education.

TEACHER TRAINING

Preemployment Instruction. — The general purpose of any provision for teacher training is to provide competent teachers in the field with which the teacher training deals. In the case of Federally aided vocational education practically all teacher training is carried on under the general provisions of state plans. As the teacher-training program has developed more and more attention has been paid to what has become known as professional improvement; that is, forms of teacher training provided for the benefit of persons who have already become teachers. In the case of teacher training for vocational agriculture and home economics, preemployment training is given practically entirely through institutions designated for that function by state boards. In the majority of cases these institutions are land-grant colleges of the respective states, though in some cases the state university has also discharged this function. In the case of trade and industrial teacher training, considering the states as a whole, relatively little teacher training is operated upon a preëmployment basis, and in the case of only four states is this form of teacher training provided through institutional preëmployment work.

Institutional teacher training is now fairly well standardized and consists of certain professional courses usually provided during the junior and senior years. In addition, these institutions usually provide a certain amount of technical training which is considered as contributing toward occupational competency. In the field of trade and industrial education such preëmployment training as is provided usually takes the form of evening classes either carried on directly by the staff of the state board for vocational education or through the utilization of services of an itinerant teacher trainer.

Professional improvement is provided mainly either through summer school courses provided by teacher-training institutions, or through the unorganized teacher training provided by the supervisors. At present many states set up certain professional improvement qualifications which have to be met in order to secure increases in salaries or promotion or, in some cases, retention. In many states this takes the form of certain specified courses representing a certain number of clock hours. In other cases the character of professional improvement is left to an individual arrangement between the state office and the teacher. It is evident that professional improvement must rank higher in efficiency than preemployment training because it deals with people who are already employed, and hence have a much more adequate apperceptive base. If properly organized and carried out it provides for the immediate correlation of the professional improvement with the work of the teacher.

Practice Teaching.—It is now generally recognized that teacher training is one form of vocational education. Recognition of this point of view is found in the fact that practically all preëmployment teacher-training courses provide for practice teaching. This corresponds in function to the shop work as carried on in an all-day school. The prospective teacher is given an opportunity to teach for a certain period of time under the supervision of the teacher trainer or a representative.

CIVILIAN VOCATIONAL REHABILITATION

Scope of the Work.—Civilian vocational rehabilitation deals with those individuals who through accident or other cause have lost their earning power in whole or in part. Its objective is to assist such individuals to secure the maximum earning ability of which they are capable, or, if possible, an earning ability equal to that which they possessed previous to their injury. The program of civilian rehabilitation is now carried on by 44 states, working in coöperation with the Federal government under the terms of the Civilian Vocational Rehabilitation Act. The Federal appropriation amounts to $1,000,000 a year, allotted to the states in the proportion their population bears to the total population of the country, and Federal funds must be at least matched by state funds, local funds, or both. Unlike the situation in vocational education, civilian rehabilitation is carried on practically entirely from state offices. The administration of Federal funds has been placed by Congress in the hands of the Federal Board for Vocational education. The Act also provides an appropriation of approximately $79,000 for administration research and service. During the last year three additional states enacted legislation providing for civilian vocational rehabilitation, and by enactment Congress extended the benefits of the Act to the District of Columbia. In 1929 4645 cases were reported by the states as having been rehabilitated. The personnel engaged in the work consists of six members of the staff of the Federal Board for Vocational Education and approximately 140 men and women employed by state boards for vocational education.

Rehabilitation Problems.—During the last year there has been a steadily increasing trend toward the consideration of operative problems as against problems of administration. One of the problems which is now getting serious consideration is the attempt to coördinate the results of compensation laws with the work of the rehabilitation service in the states. A second problem is represented by certain studies which have been made in order to determine just what sort of work an individual with a given disability can successfully handle. Another problem is the determination of the real reasons why handicapped individuals who are capable of doing a certain piece of work are either reluctantly employed or can not secure employment at all. As these problems and others of a similar character are successfully worked out, the effectiveness of the rehabilitation work will undoubtedly be increased.

ADULT EDUCATION

By Mary L. Ely

Editor of Publications, American Association for Adult Education

---

DEFINITION

Characteristics.—Adult Education, expressed and visualized in the United States of America as a "movement," represents new tendencies and developments in educational theory and practice. It emphasizes need and desire, not age, as fundamental in education. Perhaps the essential characteristic of adult education—and in this it differs from all other forms of education—is found in the basic idea of continuous mind-expansion as necessary for personal growth and social progress.

Aims.—The catholicity of the movement forbids any close definition of the term "adult education." Dean James E. Russell, President of the American Association for Adult Education, says: "The aim of adult education is to inspire grown-ups to be something more than they are now and to do their work better than they now do it. Its beginning is wherever one find's one's self. It ends only when ambition ceases to function. At its best it leads to constantly increasing richness of life, better appreciation of what life offers, greater satisfaction in the use of mind and body, and better understanding of the rights and duties of one's fellowmen."

SCOPE OF MOVEMENT

Europe and Asia.—Adult education is not confined to the United States. It had its beginnings and has probably had its most far-reaching developments in Europe. In England more than a century ago many of the contemporary forms of adult education had already made themselves manifest. In the present century, and especially in the years following the War, the movement has progressed rapidly in all the greater divisions of the British Commonwealth, as well as in the principal states of Continental Europe and of Asia.

World Conference.—In August, 1929 there assembled in Cambridge, England, the first World Conference of Adult Education. Forty-six countries were represented. Prepared reports and addresses dealing with adult education activities in more than half of these countries were presented, and informal accounts were given of the work carried on in the others. These reports bore evidence that adult education is a well-established and important division of the educational work of enlightened nations. As a result of the World Conference, participating national groups have established a new international relationship which should be powerful in promoting reciprocal understanding among nations, the only sound basis for world peace.

Contributing Agencies in the United States.—Some idea of the diversity of agencies contributing to the adult education movement in the United States may be gathered from the topics treated in a summer course on adult education given at Teachers College, Columbia University in 1929. After introductory talks upon the growth of adult education as a world movement, its place in the American scheme, its philosophy, its psychological basis, its possible retroactive effects upon primary and secondary education, the following specific phases were discussed: community organization for adult education; experimental schools and classes; programs of national organizations such as the Y. M. C. A. and Y. W. C. A.; workers' education; university extension; urban universities; the continuing education of collegiate alumni; correspondence schools; libraries; Chautauquas; parent education; and corporation ventures in adult education. The public school programs were presented in lectures on the following subjects: industrial education; immigrant education; commercial education; home economics; evening schools; and continuation schools. Though the summer course was six weeks, it could by no means deal with all the avenues through which adult education is advancing, nor with all the agencies which promote it. To the agencies above should be added museums, people's institutes, forums, churches, clubs of many sorts, and departments of the Federal Government. Even then the list is not exhaustive.

ACTIVITIES IN ADULT EDUCATION

Colleges and Summer Sessions.—Since adult education is addressed chiefly to those whose primary interest lies in a vocation, its program is adjusted to times of leisure. It concentrates in evening classes and summer schools. The former may meet several times a week or as infrequently as a fortnight. The latter vary in length of session from a few days at labor institutes to eight weeks, which is the period covered by the Bryn Mawr Summer School for Women Workers in Industry, one of the oldest and best-known of the adult education summer schools. Only one other workers' school dates back to 1921 when the Bryn Mawr School opened. During the summer of 1929, there were nearly a score of adult education summer sessions. There have also been established during the last few years several adult education colleges. Pocono People's College, Henryville, Pennsylvania, and others, are modeled on the Danish folk schools. Brookwood Labor College, at Katonah, New York, and Vineyard Shore School at West Park-on-Hudson, New York, are residential workers' colleges.

Curricula Features.—All adult education activities are alike in certain important respects which differentiate them from compulsory education of children and adolescents. Adult education students are men and women of experience and of more or less developed interests and concerns, and, what is equally important, they are voluntary students and continue in classes and schools only so long as the programs offer something that seems vital and worth while to them. This means that, in the planning of adult education curricula, the needs and desires of the students must be consulted to an extent that is seldom considered practicable in the case of younger students.

Significant changes have sprung from this circumstance. The academically-minded have been called upon to meet a demand which cuts across the traditional divisions of knowledge, and takes, wherever it can find it, the material that contributes to an understanding of human situations and problems. On the other hand, those who are inspired by brotherly love and a desire for universal educational salvation have recognized the fact that an educational program needs a firmer foundation than Utopian yearnings and altruistic sentiments. The experience of adult students must be taken into account not only in the choice of subject and content for study but also in the presentation whenever that experience can help to elucidate the question under consideration. To achieve that end the discussion method, which gives the students an opportunity for active participation, has been widely used. Among adult education leaders and teachers something of a technique of discussion is now being developed.

PROMOTION AGENCIES

American Association for Adult Education.—It was the recognition of the significance of the movement for adult education in other countries and of the increasing interest in various forms of continuing education in the United States that led to an inquiry into American conditions, made in 1924 by the Carnegie Corporation of New York. A series of Studies in Adult Education (Macmillan), covering five broad phases of the subject, was one of the direct results. Another was the organization, in 1926, of an American Association for Adult Education, which provides a common meeting place for individuals and ideas in adult education, and a clearing house for adult education activities. It is a national organization, with headquarters at 41 East Forty-second Street, New York City.

Journal of Adult Education.—The American Association for Adult Education publishes a quarterly Journal, the first number of which appeared in January 1929. The Journal is the main medium through which the Association functions as a clearing house for information and ideas.

RESEARCH AND EXPERIMENTATION

Continuing Education of Collegiate Alumni. — The following studies, which have been carried on under the auspices of the American Association for Adult Education during the last year, are particularly significant as pointing directions in which the adult education movement is expanding. Two years ago the American Alumni Council expressed its belief that educational institutions have a responsibility for continuing intellectual relationships with their alumni. A study of alumni education, which has just been completed, leaves no doubt that both colleges and alumni are ready for this new development. Several colleges, among which Smith was a pioneer, are supplying reading lists to their graduates. Educational conferences, institutes, and study groups, are other activities which the colleges are encouraging among their alumni. In June 1929, Lafayette College organized an Alumni College and conducted its first session for the benefit of the graduates.

The Little Theater.—A study of the drama and little theater movement in its relation to adult education has been made during 1929. The findings reveal that there are more than a thousand little theaters regularly engaged in presenting dramatic productions to audiences totaling more than half a million persons. The little theaters fill a need for those men and women who demand more than the motion pictures and touring companies can supply. They provide an opportunity for creative, self-expressive work along lines that are ordinarily blocked in everyday activity. In a theater which is a product of voluntary group effort, even the members of the audience can feel this. An account of the little theater and drama study has just been published under the title *Footlights Across America.*

Radio Study.—A study of the possibilities of radio broadcasting as a mechanism in adult education is being made. This study will be parallel to, and in coöperation with, an investigation of the educational use of the radio begun during the summer of 1929 by a special committee appointed by Secretary Wilbur of the Department of the Interior. Dr. Cooper, of the Bureau of Education, is chairman of Secretary Wilbur's committee.

Community Organization.—A new fellowship is manifesting itself among individuals and organizations interested in adult education both in smaller towns and in the larger cities, where various projects are being coordinated in community programs. An experiment initiated in the autumn of 1927 under the auspices of the National Community Foundation and carried on in sixty small cities and towns of the Middle Atlantic States has been followed during 1929 by a more intensive effort in Chester County, Pennsylvania. As a result, a county library movement is at present well under way; a county drama league has been formed; a lecture bureau service established, and a number of other educational activities brought to public notice. Several of the large cities in the United States have organized their adult educational work on a community basis. Among these are Cleveland, Buffalo, Detroit, Chicago, Dallas, New York and Nashville. Similar group federations are now being formed in Boston, Washington, Pittsburgh, Minneapolis, Duluth, St. Louis, and Los Angeles.

Rural Activities.—In rural districts, Government agencies (*e.g.* the Smith-Lever Service) and voluntary local associations are leading in the adult education movement rather than schools, libraries, universities and allied organizations which are conspicuous in urban areas. Granges, dairy associations, and various women's organizations give effective service in the country. Correspondence schools and the radio are great potential forces. A successful experiment in rural adult education has been in progress in Barry and Jackson counties, Michigan, for the last three years. Within the last year, similar experiments have been initiated or planned in the following states: New Hampshire, Massachusetts, New York, North Carolina, West Virginia, Ohio, Indiana, Iowa, Wisconsin, Minnesota, and Missouri.

BIBLIOGRAPHY

Alderman L. R. *Adult Education Activities During the Biennium 1926-1928.* Bulletin, 1929, No. 23. United States Government Printing Office.

Gray, W. S. and Munroe, Ruth. *The Reading Interests and Habits of Adults.* Macmillan.

Hader, J. and Lindeman, E. C. *What Do Workers Study?* Workers Education Bureau Press.

International Handbook of Adult Education. World Association for Adult Education, Russell Square, London.

Kolbe, P. R. *Urban Influences on Higher Education.* Macmillan.

Macgowan, Kenneth. *Footlights Across America.* Harcourt, Brace.

Smith, H. W. *Women Workers at the Bryn Mawr Summer School.* Affiliated Summer Schools, 218 Madison Avenue, New York City.

Yeaxlee, B. A. *Lifelong Education.* London, Cassell.

PURE RESEARCH IN EDUCATIONAL INSTITUTIONS

BY ELBERT VAUGHAN WILLS

EDITOR-IN-CHIEF, *U. S. Navy Department Standard Stock Catalogue*

COÖRDINATION OF RESEARCH ACTIVITIES

The Keynote.—The general theme determining the program of the annual meeting of the American Council on Education, held at Washington in May, might be taken as the keynote of research development during the year 1929: "How can we make education meet nationally significant tendencies in American life?" With the growing importance of pure research activities in universities, it has become increasingly manifest that sharply drawn lines between the departments of instruction impair the development of research undertakings. The need for articulating the work of fundamental departments in coöperative research undertakings was pointed out in the inaugural address of President Robert M. Hutchins, of the University of Chicago, in November.

The Yale Institute of Human Relations.—The outstanding development of the year in this field was the establishment of the Institute of Human Relations at Yale University. This was made possible by gifts and subsidies from a group of foundations. The erection of a building for housing the Institute was begun in September. The Institute constitutes another step in the development of the human welfare group at Yale, which seeks to correlate scientific knowledge in the study of man from the mental, physical, and social points of view. It has for its primary purpose the coördination of biological, psychological, economic and sociological research, together with the findings of legal, medical, and psychiatric research in the interest of increasing the understanding of human behavior in its normal and abnormal phases. It will seek to determine more adequate educational methods, particularly in the legal and medical fields, and to discover and evaluate environmental influences upon children.

Coöperative Studies at Columbia University.—A project of research concerning the basic elements of the crime situation in America, and involving the coöperation of specialists in law, criminology, psychology, psychiatry, and sociology, was announced by Columbia University. A similar coöperative study of world family laws from the legal and sociological viewpoints was undertaken by the same institution.

Border Fields of Science at Cornell.—Cornell University outlined a program of research in the middle ground between the physical and biological sciences which will ultimately require an endowment of about $9,000,000, the plan contemplating three steps requiring capital amounts of $3,000,000 each. In June, the university announced a gift by the General Education Board of $1,500,000 toward the first stage of this project, contingent upon the raising of a similar amount by June, 1930. The plan involves the development of research in the basic sciences of biology, chemistry, and physics, and in the coordination of these sciences through research in the fields of biochemistry, biophysics, and general physiology.

Institute of Comparative Law at Harvard.—Harvard University established an Institute of Comparative Law, for the scientific investigation of legal materials and problems.

Institute of Law at Johns Hopkins.—The Johns Hopkins University announced in October the completion of plans for a research building for the Institute of Law already established at that university. The erection of the building was made possible by a gift of $450,000 from an anonymous donor. The Institute has for its objective, according to President Ames, "the integration of the social sciences in a study of the law in its broadest sense."

Institute for Research in Social Sciences, University of Virginia.—During the year, the Institute for Research in the Social Sciences at the University of Virginia published the results of four studies and had in progress ten additional research projects in the social sciences.

AIMS IN RESEARCH

The early history of research in American universities was characterized by a splendid devotion to the quest for truth for its own sake. This spirit spurred on the pioneers of research in the face of meager facilities, inadequate support, and slight public recognition. The recent extraordinary growth in facilities for research in America has been motivated primarily by utilitarian interests, although in the case of pure research in universities these considerations are not of the narrow variety demanding immediate tangible results. Under these conditions there arises a question as to whether the idealism which characterized the research worker of the past is in danger of giving way to a more definitely utilitarian spirit. This question was answered in the negative by Professor Pupin of Columbia University, who repudiated the suggestion that the leaders of research at the present time are "slaves of a utilitarian mind lying prostrate in the presence of machines." Inasmuch as the university must train both the workers in applied research and the pure research investigators, there is set for the educator the problem of so humanizing the spirit of research that the idealism of the old may be preserved along with the practical trend of the new.

THE PROBLEMS OF LEVELS IN THE GRADUATE SCHOOL

The problem presented by the growing disparity between levels in the graduate school, which had attracted a considerable measure of attention during the preceding year, was stressed in the report of the dean of the faculties of Political Science, Philosophy and Pure Science at Columbia University. Professor Woodbridge, the retiring dean, pointed out that graduate registration has run far ahead of the number of legitimate candidates for degrees, rendering necessary a work of selection in the graduate school in order to maintain scholarly standards. Graduate students on the lower level include those who lack the aptitude or the ambition for enlarging the boundaries of human knowledge. This level is a continuation of the work of the college, and the needs of these students are distinguished sharply from those of students who are capable of attaining the higher level involving efficiency in research. Dean Woodbridge also pointed out the effect of the pressure of increasing numbers of graduate students upon research by members of the instructional staff. With increasing registration in graduate schools, the problem of caring for large numbers of graduate students on the lower level without impairing the effectiveness of the work of training for research, becomes an acute one. Those teachers who are most productive in fostering the spirit of research are often also most successful in stimulating to higher levels of serious endeavor students who enter the graduate school perhaps with the purpose only of accumulating credits or satisfying conditions for promotion in systems.

FELLOWSHIPS AND GRANTS IN AID OF RESEARCH

Advanced Fellowships.—The research activities of members of the instructional staffs of institutions of higher education have long been significant. Fellowships for graduate students exist in varying numbers at all of the more important universities. Fellowships for promoting research by students who have received the doctorate or its equivalent, however, represent a development of recent years. Endowed fellowships of this character have been established at several of the leading universities and a greater number are maintained by foundations.

The National Research Council aids in the support of the activities of university investigators engaged in university laboratories upon projects planned by the research committees of the Council. These studies are maintained under circumstances which involve coöperation between the Council and the universities at which the studies are being conducted. In addition, the Council continued to maintain, with the financial assistance of the Rockefeller Foundation and other organizations, three series of postdoctorate National Research Fellowships, representing the natural sciences, the biological sciences and the medical sciences.

Increase in Research Grants.—Grants in aid of research projects showed noteworthy increase. In April, Harvard University announced grants from the Milton Fund to 41 professors for conducting research projects. These grants amounted to a total of $58,000.00. The American Council of Learned Societies awarded grants in aid of research to 17 scholars pursuing investigations in archeology, art, folklore, history, literature and philology. The Social Science Research Council announced in March the award of 24 fellowships and the renewal of three previously awarded. These fellowships carry grants designed to enable their holders to pursue in various parts of the world original investigations in economics, education, history, political science, and sociology. The Rockefeller Foundation made available to the National Research Council a limited fund for making grants-in-aid, of comparatively small amounts, for the support of research work of individual American investigators and of special research projects of restricted extent in the fields represented by the divisions of the Council. Eighteen grants from this fund were announced during the year. In February, three grants were made from the Elizabeth Thompson Science Fund for furthering the work of investigators in universities in the fields of physics and biology. The John Simon Guggenheim Memorial Foundation announced in March the award of fellowships for study and research abroad to 49 scholars, and the renewal of fellowships previously awarded to 14 others.

RESEARCH DEVELOPMENTS IN INDIVIDUAL INSTITUTIONS

Carnegie Institute of Technology.—Continuing the general plan of a research program undertaken during the preceding year, the Institute, in coöperation with the U. S. Bureau of Mines and advisory boards of mining and metallurgical engineers and executives, undertook a program of eight research studies, four in the field of fuel chemistry and four in ferrous metallurgy. Research fellowships were awarded to eight graduate students for conducting these investigations and preparing reports of the results for publication.

University of Chicago.—The University announced in January a gift of $270,000 from John D. Rockefeller and a maintenance income from the Laura Spelman Rockefeller Memorial

Foundation, for the establishment and maintenance of an institute for graduate training and research in anthropology. The project will be centered at Santa Fe, N. M., and will include a museum and laboratory for research and facilities for the field training of graduate students.

Johns Hopkins University.—A chair of chemical education was established through gifts aggregating $500,000, the largest contributor being Francis P. Garvan, President of the Chemical Foundation, in honor of whom the chair was named. In connection with this professorship, the University's National Fellowship Plan in Chemical Education was inaugurated. This provides for the development of leaders in chemistry through the training in research of outstanding students. When it was put in operation through the formal dedication of the chair Oct. 11, nineteen fellowships had been established and nine holders of these fellowships had already enrolled. Appointments are made for four years, tenure depending upon a satisfactory record from year to year. The fellowships yield a stipend of $1000 per annum. The plan contemplates the eventual provision of a fellowship for each State. Fellows will be unrestricted in their choice of research projects.

University of Pennsylvania.—A Department of Industrial Research was established for the scientific study of the problems of industry, using the industries of Philadelphia as typical. This department had in progress during the year 23 studies, mainly in coöperation with foundations or commercial associations. A series of publications presenting the results of these studies was in preparation.

Yale.—Through the Alfred Cowles Foundation for the Study of Government, established by a gift announced in May, increased facilities for research in government were made possible. Several fellowships for graduate study and research were provided and two outstanding scholars in the field of government were added to the faculty.

BIBLIOGRAPHY

BUCKINGHAM, B. R., "Philosophy and Organization of Research" (*School and Society*, vol. 29, pp. 755-764, June 15, 1929).

CRAWFORD, CLAUDE C., *The Technique of Research in Education* (Los Angeles, University of Southern California Press, 1928).
(Deals specifically with methodology of research in education. Largely applicable, however, to other subjects.)

FILENE, E. A., "Contributions of Research to Business" (University of the State of New York, *Proceedings of the Convocation*, 1928, pp. 67-76).

GEE, WILSON P. (editor), *Research in the Social Sciences; Its Fundamental Methods and Objectives* (New York, The Macmillan Co., 1929).
(Lectures before the Institute for Research in the Social Sciences at the University of Virginia.)

HULL, C., AND WEST, C. J., *Funds Available in the United States for the Support and Encouragement of Research in Science and its Technologies* (Washington, D. C., National Research Council, 2d Ed., 1928).

LEUSCHNER, A. O., "Research Professorships" (American Association of University Professors, *Bulletin*, vol. 15, pp. 440-444, October, 1929).

WICKENDEN, W. E., "Research in the Engineering Colleges" (*Science*, n.s., vol. 69, pp. 312-318, March 22, 1929).

EDUCATIONAL MISCELLANIES

By Ned H. Dearborn

Professor of Education, New York University

UNITED STATES OFFICE OF EDUCATION

Organization.—William John Cooper became Commissioner of Education Feb. 11, 1929, and soon thereafter began a careful study of the functions of the Bureau of Education looking to its internal reorganization. Secretary Wilbur of the Department of the Interior Oct. 3 authorized the new name. Commissioner Cooper's plan of reorganization, now in effect, follows:

"Division A, Administration in charge of the chief clerk, including (1) the housing and routine administration of the offices at Washington; (2) the Alaskan schools—all administrative duties.

"Division B, Educational Research and Investigations in charge of the assistant commissioner, including (1) collegiate and professional schools; (2) American schools systems; (3) special problems (including indigenous peoples); (4) foreign schools systems; (5) statistical service.

"Division C, Publications in charge of the editor-in-chief, including (1) biennial survey; (2) School Life; (3) bulletin service.

"Division D, Library Service in charge of librarian, including (1) the library of education; (2) service to librarians; (3) service to office staff; (4) service to schools of education (survey data, etc.).

"Division E, Educational Service in charge of service chief, including (1) correspondence lessons; (2) education by radio; (3) coöperation with other officials of the Federal Government; (4) coöperation with non-official agencies; (5) organization and condition of local surveys; (6) approved promotional work.

"Division F, Major Educational Surveys in charge of the commissioner."

Research.—The most significant aspect of the plan, according to many prominent educators, is the increased emphasis on research. The Office is now conducting two national studies (Land-Grant Colleges and Secondary Education) and contemplates the continued support of Congress for others. This type of service leading to a wide dissemination of information on matters of national importance is tremendously important and valuable.

NATIONAL ADVISORY COMMITTEE ON EDUCATION

Under the auspices of the American Council on Education a national advisory committee has been appointed to study education in relation to national life. This committee is composed of 51 members. The Director of the American Council on Education is chairman and the Secretary of the National Education Association is secretary. The Committee has appointed Dr. Henry Suzzalo to direct the investigations. The Director will work in close coöperation with United States Commissioner on Education with the approval of the Secretary of the Interior and through the General Advisory Committee with special advisory committees throughout the country chosen to represent the various aspects of education. In view of the nature of the study, particular emphasis will be placed upon the proper functions of the Federal Government in education for the nation, which are stated by the Committee as follows: 1. Gather, compile, interpret and disseminate adequate statistics of national scope at all levels of education; 2. conduct research on basic educational problems of national significance; 3. maintain an adequate library of educational works and make it accessible to the public; 4. maintain a legislative digest and information service to which state legislatures could look for information concerning the laws of other states and of foreign countries concerning education, and 5. furnish experts on request to coöperate in state or community surveys in education.

INTERNATIONAL EDUCATION CONFERENCES

Psychology Congress.—For the first time in the history of the organization the International Congress of Psychologists met in this country. The conference was held at Yale University in September. Noted psychologists throughout the world were present and made outstanding contributions to psychology and to education.

Fifth International Conference of the New Education Fellowship was held at Elsinore, Denmark, Aug. 8 to 21. The topic was "The New Psychology and the Curriculum." Lectures, motion pictures, exhibitions, and demonstrations of work done in "new schools" constituted the program. Many American educators were present and some reported concerning the "child-centered school" movement in this country.

The Third Biennial Meeting of the World Federation of Education Associations was held in July at Geneva. The central theme was "International Understanding Through Education." Dr. A. O. Thomas, formerly Commissioner of Education in Maine and President of the Federation, presided. One of the important declarations of the Federation is as follows: "The teachers of the world have it in their hands to promote the cause of international understanding and world peace by bringing their influence to bear upon the children and youth entrusted to their charge in the direction of ideals for mutual goodwill and service in the common interest."

THE JOHN DEWEY CELEBRATION

Oct. 18 and 19 at Columbia University, the seventieth birthday of John Dewey was celebrated. This event is of national importance because it focused attention of the entire country upon the educational contributions of this great philosopher, educator, liberal, citizen and humanist. The work of this man is looked upon as of outstanding importance to American education and his place of supremacy in philosophy and education is unanimously acclaimed, not only by America, but by the entire civilized world.

EDUCATIONAL CIVIC AND LEARNED ASSOCIATIONS

The *Educational Directory for 1929*, published by the U. S. Office of Education, lists approximately six hundred associations of these types. A large percentage of them are educational. Practically all of them issue bulletins, proceedings or year books. Among those which have issued year books that have been developed around a central theme the following associations and year book reports have met with widespread attention in their respective fields: 1. National Conference of Supervisors and Directors of Instruction — "Scientific Method in Supervision"; 2. N. E. A. Department of Elementary School Principals—"Activities of the Principal." 3. N. E. A. Department of Superintendence—"The Articulation of the Units of American Education," and 4. National Society for the Study of Education—"Current Educational Readjustments in Higher Institutions."

HEALTH EDUCATION

The promotion of health work for children has been given great impetus in the call by President Hoover of the Conference of Child Health and Protection. It is significant that child health and protection work is thus given official recognition. One of the important conferences on health education in 1929 was held at Sayville, L. I., June 17-21. The elementary, secondary, and the teacher preparation sections considered two aspects; (1) World activities and materials, and (2) Principles of organization. A preliminary report has been issued by the American Health Association and a complete report is in progress. Another attempt to help solve some of the problems in this field is found in the report of the Carnegie Foundation for the Advancement of Teachers,—*Bulletin No. 23*, on "Problems of American Athletes." Attention was centered on intercollegiate sports but the values of the report are more far-reaching in as much as correlative with this report several publications have appeared which deal with interscholastic competition in elementary and particularly in secondary schools. A vigorous and wholesome attempt is being made to direct the thinking about school and college athletics to the educational values that may be realized.

AVIATION IN EDUCATION

During the current year, the teaching of aeronautics has taken a prominent place in the educational program of the country. At present, three hundred public school systems are giving some instruction in aeronautics on the elementary or secondary level or both. In about fifty of these systems, the instruction includes vocational and trade education courses. Sixty-five colleges have admitted aeronautics to their curriculum, thirteen of them presenting four-year courses leading to the baccalaureate degree. The Daniel Guggenheim Fund Committee on Elementary and Secondary Aeronautical Education has rendered valuable assistance in this work on the elementary and secondary level.

RADIO IN EDUCATION

Many experiments are being conducted in this field in various parts of the country. An outstanding example is found in the rural education department of Teachers College, Columbia University. This department undertook a research study in coöperation with rural schools in New York, New Jersey, Pennsylvania, Connecticut, Massachusetts and Maryland. The study is financed by the Keith Fund and endeavors to gain knowledge of the technical and administrative details of the use of radio in rural schools; knowledge of how to adapt or make use of such programs and the development of techniques of supervision in their use; development of supplementary materials essential to use of programs; suggestions of desirable educational broadcasts; a gradual increase of programs designed for and appropriate to school use; and a definite contribution to the furtherance of the development of educational broadcasting.

EDUCATIONAL ADMINISTRATION

Leaders in this field indicate that there are outstanding developments which deserve mention. For example, the principle of equalization in the distribution of school funds, development of community school building programs, financial accounting, the acceptance of a minimum salary schedule for teachers, tenure of teachers, business management of local school systems, and the elimination of the unprepared teacher.

COGNATE SOCIETIES

GENERAL

American Assn. for Adult Education, 41 E. 42nd St., New York City, New York.

American Assn. for the Advancement of Science, Smithsonian Institute Bldg., Washington, D. C.

American Civic Assn., 901 Union Trust Bldg., Washington, D. C.

American Council of Learned Societies, 907-15th St., Washington, D. C.

American Council on Education, 26 Jackson Place, Washington, D. C.

American Education Assn., 522 Fifth Ave., New York City.

American Federation of Teachers, 327 S. La Salle St., Chicago, Ill.

American University Union, Columbia University, New York City.

General Education Board, 61 Broadway, New York City.

National Assn. of Directors of Educational Research, University of Michigan, Ann Arbor, Mich.

National Congress of Parents & Teachers, 1201-16th St., N. W., Washington, D. C.

National Council of Education, 200 New Jersey Ave., N. W., Washington, D. C.

National Education Assn. of the U. S., 1201-16th St., N. W., Washington, D. C.

National Home and School Assn., Inc., 17 E. 42nd St., New York City.

National Research Council, Division of Educational Relations, B. & 21st Sts., N. W., Washington, D. C.

NATIONAL SOCIETY FOR THE STUDY OF EDUCATION, 10 Putnam St., Danvers, Mass.

PUBLIC EDUCATION ASSN., 8 W. 40th St., New York City.

INTERNATIONAL

ASSN. OF AMERICAN RHODES SCHOLARS, Bank of Manhattan, 40 Wall St., New York City.

INSTITUTE OF INTERNATIONAL EDUCATION, 2 W. 45th St., New York City, New York.

INTERNATIONAL COUNCIL FOR THE EDUCATION OF EXCEPTIONAL CHILDREN, 100 East Grand River Ave., Detroit, Mich.

INTERNATIONAL COUNCIL OF RELIGIOUS EDUCATION, 100 E. 42nd St., New York City.

INTERNATIONAL EDUCATIONAL ASSN., 80 E. 11th St., New York City.

INTERNATIONAL KINDERGARTEN UNION, 1201-16th St., N. W., Washington, D. C.

INTERNATIONAL LYCEUM AND CHAUTAUQUA ASSN., 431 S. Wabash Ave., Chicago, Ill.

LEAGUE OF NATIONS COMMITTEE ON INTELLECTUAL COÖPERATION, Geneva, Switzerland.

PAN-AMERICAN EDUCATIONAL CONGRESS, Universidad de Chile, Santiago, Chile.

TEACHERS

AMERICAN FEDERATION OF TEACHERS, 327 S. La Salle St., Chicago, Ill.

EDUCATORS' ASSN., 303 Fifth Ave., New York Ctiy.

HEAD MASTERS ASSN., 241 W. 77th St., New York City.

NATIONAL ASSN. OF TEACHERS AGENCIES, 179 Whitehall St., Atlanta, Ga.

NATIONAL STUDENT FORUM, 2929 Broadway, New York City.

STUDENTS COÖPERATIVE SOCIETY, 565 Fifth Ave., New York City.

TEACHERS COUNCIL, 500 Park Ave., New York City.

TEACHERS UNION, 70 Fifth Ave., New York City.

SCHOOLS

AMERICAN SCHOOL CITIZENSHIP LEAGUE, 405 Marlborough St., Boston, Mass.

FEDERATION FOR CHILD STUDY, 242 W. 76th St., New York City.

NATIONAL ASSN. OF HIGH SCHOOL SUPERVISORS AND INSPECTORS, 1016 Michigan Ave., Ann Arbor, Mich.

NATIONAL ASSN. OF SECONDARY SCHOOL PRINCIPALS, Oak Park, Ill.

NATIONAL KINDERGARTEN ASSN., 8 W. 40th St., New York City.

Y. M. C. A. EDUCATIONAL SECRETARIES ASSN., 55 Hanson Place, Brooklyn, N. Y.

COLLEGES AND UNIVERSITIES

AMERICAN ASSN. OF COLLEGIATE REGISTRARS, University of Pittsburgh, Pittsburgh, Pa.

AMERICAN ASSN. OF JUNIOR COLLEGES, Central College, Conway, Ark.

AMERICAN ASSN. OF UNIVERSITY PROFESSORS, Charles River Road, Cambridge, Mass.

AMERICAN SOCIETY FOR THE EXTENSION OF UNIVERSITY TEACHING, 925 Chestnut St., Philadelphia, Pa.

AMERICAN UNIVERSITY UNION, 2 West 45th St., New York City.

ASSN. OF AMERICAN COLLEGES, 111 Fifth Ave., New York City.

ASSN. OF AMERICAN UNIVERSITIES, University of California, Berkeley, Cal.

ASSN. OF COLLEGES FOR NEGRO YOUTH, Shaw University, Charlotte, N. C.

ASSN. OF LAND GRANT COLLEGES, Iowa State College, Ames, Iowa.

ASSN. OF URBAN UNIVERSITIES, College of the City of N. Y., New York City.

COLLEGE ENTRANCE EXAMINATION BOARD, 431 W. 117th St., New York City.

NATIONAL ASSN. OF COLLEGES AND UNIVERSITIES, Atlanta, Ga.

NATIONAL ASSN. OF STATE UNIVERSITIES IN THE U. S., University of Illinois, Urbana, Ill.

NATIONAL UNIVERSITY EXTENSION ASSN., 267 State House, Boston, Mass.

NATIONAL UNIVERSITY EXTENSION ASSN., Dept. of Education, State House, Boston, Mass.

NEW ENGLAND ASSN. OF COLLEGES AND SECONDARY SCHOOLS, Wellesley College, Wellesley, Mass.

PHI BETA KAPPA, 145 W. 55th St., New York City.

PROFESSIONAL EDUCATION

American Assn. of Teachers Colleges, School of Education, Cleveland, Ohio.

American Bar Assn., Section of Legal Education, 209 S. La Salle St., Chicago, Ill.

American Medical Assn., Council on Medical Education and Hospitals, 535 N. Dearborn St., Chicago, Ill.

Assn. of American Law Schools, 62 Law School, Harvard University, Cambridge, Mass.

Assn. of American Law Schools, 102 Law Bldg., Iowa City, Iowa.

Assn. of American Medical Colleges, 25 E. Washington St., Chicago, Ill.

SPECIAL EDUCATION

American Assn. to Promote Teaching of Speech to the Deaf, 1601 35th St., N. W., Washington, D. C.

American Child Health Assn., 370 Seventh Ave., New York City.

American Humane Education Society, 180 Longwood Ave., Boston, Mass.

American Physical Educational Assn., Highland Station, Springfield, Mass., Box G.

National Assn. of the Deaf, School for the Deaf, Trenton, N. J.

VOCATIONAL

American Assn. for the Advancement of Agricultural Teaching, E. Lansing, Mich.

American Assn. of University Women, 1634 Eye St., N. W., Washington, D. C.

American Home Economics Assn., 41 Eliot Memorial Road, Newtonville, Mass.

Bureau of American Workers' Education, 416 W. 24th St., New York City.

National Society of Vocational Education, Dept. of Public Instruction, Harrisburg, Pa.

National Vocational Guidance Assn., Bureau of Vocational Guidance, Harvard University, Cambridge, Mass.

New England Home Economics Assn., 41 Eliot Memorial Rd., Newtonville, Mass.

Trade Union Education League, 26 Union Square, New York City.

Vocational Education Assn. of the Middle West, 1711 Estes Ave., Chicago, Ill.

INDEX

ABYSSINIA, White-Coats Expedition, 666
Accomplishments of army personnel, 247-256
Act, Agricultural Marketing, 375, 376-377
  Clayton Anti-trust, 86
  Cooper-Hawes, 8
  Jones, 20
    -Stalker, 87
  Migratory Bird, 377
    Conservation, 8
  Radio, 8, 89
  Settlement, 135
  Sherman, 85, 86
  Volstead, 87, 90
Administration, Bureau of Public Personnel, 77-78
  Federal Legislation, 6
    Organization of, 70-77
  Hoover, 48
    and the League of Nations, 49
  Judiciary, State, 97-99
  Personnel of, 67-70
  Policy of, 1-6
  Problem of, 77
  Research, 106-109
  Responsibility, 78
  Tariff, 423-426
Adrenal, the, 720
Adventure, Books on, 769
Aerial Photography (See Aviation)
  Organization, Committee on (See Aviation)
Aerodynamics (See Aviation)
Aerology (See Aviation)
Aerostation (See Aviation)
Aeronautical Board (See Aviation), 282
  Progress (See Aviation)
Aeronautics (See Aviation)
Afghanistan, Trouble in, 44
Africa
  Archaeological Discoveries in, 799
  Books on, 769
  Copper output, 411
  Influence of Christianity, 549
  Liquor traffic, 30
  Slavery, 30
Aged, Care of the, 504
Agnew, P. G., 630
Agricultural Adjustment, 369-370
  Chemistry, 677-681
  Conditions of, 369-376
  Cooperative Movement, 375-376
  Economics,
    Bureau of, 458
  Education (See George-Reed Act)
  Legislation, 376-378
  Marketing Act, 3, 7, 313, 372, 373, 375-377
  Revenue, 372-373
Agriculture, Allied Industries, 369
  Changes in duties, 378
  Department of, 73
  Financial aspects, 369
  Tariff, The, 378
Ahmes Papyrus, 573
Air Cleaner, 611
  Commerce Act (See Aviation)
  Coordination Committee
    Advisory (See Aviation)
  Corps (See Aviation)
  Craft Signal Corps (See Aviation), 248
  Mail Routes (See Aviation)
  Navigation Maps (See Aviation), 197
  Ship (See Aviation)
    Dock, 587-588
  Planes (See Aviation)
  Ports of Entry (See Aviation)
Aishton, R. H., 434
Akkad, Semitic Inscriptions, 790
Alamogordo, Archaeological Discoveries in, 799
Alaska, 127-131
  Agricultural Legislation of, 377
  Commerce, 127
  Earthquakes, 647-649
  Education, 128-129
  Finances, 128
  Fisheries, 398
  Fur Leases, 211
  Gold Output, 413
  Industries, 127-128
  Transportation, 129
Alcohols, Decomposition of, 676
Alden, Carroll Storrs, 290
Alexander, Boyd R., 614
Alien Population, Naturalization of, 480
  Seamen, 477
    Reentry of, 474-475
Aliens, Admission of, 476
  Certificates of registry, 477-478
  Deportation of, 473-474
  Exclusion of, 477
  Reentry permits, 477
Alloy Piston, 610
Alloys, 683
  New and Improved, 594
Aluminum, 682
  Alloy connecting rods, 610
  Airship, all-metal, 682
  Cars, 682
  Use in railways, 446
Amendments, Constitutional, 22
  House, 6
  Senate, 6
  State, 91-92
America, Primitive, 759
  Relations to the League of Nations, 48-54
    World Court, 48-54
American Association for
    Adult Education, 852
    Dental Schools, 731
    Economic Entomologists, 712
    Social Workers, 502-503
    Teachers Colleges
      Program for, 841
  Astronomical Society, 576
  Bar Association, 99
  Biography, Dictionary of, 766
  Birth Control League, 757-758
  Civic Association, 117
    Committee on Regional Planning, 120
  Council of Learned Societies, 766
    Enterprises of, 756
    Officers of, 756
  Exploration, 665-668
  Federation of Labor, 50
  Fiction, 769-774
    Backgrounds of, 770
    Criticism of, 769
  Indian Ethnological Studies, 760
    Health Supervision of, 733
    Naturalization of, 469
  Influence, Spheres of, 148-150
  Library Association Conference, 794
  Mathematical Society, 571, 572, 574
  Medical Association, 838
  Meteorological Society, annual meetings, 655, 656
  Museum, Natural History, 703
    Exhibitions, 704
    Materials Collected, 668
  Participation in International Conferences, 47
  Planning Foundation, 124-125
  Philosophical Association, 746
  Political History, 1
  Property Rights, 149
  Red Work, Relief Work, 247
  Relations in Near East, 40-45
    Orient, 40-45
  Samoa
    Banking, 145
    Copra Production, 145
    Communication, 145
    Education, 145
    Government, 144
    Health, 145
    Population, 144-145
    Revenues, 145
    Taxes, 145

- American Sociological Society, 753-754
  - Standard Association, 630, 633
  - Statesmen, Biographies of, 767
  - Tariff Treaty, with China, 41
  - Universities, Historical Account of,
- Ammonia, Synthetic, 687
- Amytol, 729
- Anaemia, 727-728
- Andrews, Irene Osgood, 529
  - John B., 538
- Anesthesia, 729
  - Administration of, 729
- Animal Husbandry, research in, 385
- Animals, Diseases and Pests of, 387-388
- Annular Eclipse, 577
- Anthropology, 758-760
- Anti-aircraft Weapons (See Aviation), 250
  - Semitism, in Europe, 566
  - Trust Cases, 85
- Appraisers Stores, 425
- Appropriations Act, for Reclamation, 205
- Arabia, Conditions in, 44
- Arbitration, International Conference on, 150
- Arch Dam, Large Reinforced Concrete, 589
- Archaeological Discovery, 799-801
  - Studies, 788
  - Surveys in the United States, 759-760
- Archaeology, 786
- Arches, Tests of Reinforced Concrete, 588
- Architecture, 809-811
  - Naval, 614-618
- Architectural Bibliography, 810-811
  - Education, 810
- Arizona, Board of Tax Survey, 181
  - Boulder Dam Protest, 91
  - Gold Output, 413
- Arkansas, Education in, 834
  - Local Administration, 182-183
- Armaments, Limitation, 614
- Army Aeronautics, 256-258
  - Alpha, 761
  - Building Program, 156-157
  - Expenditures, 157
  - Joint Administration with Navy, 282
  - Medical Department, 254
  - Mental Hygiene of, 511
  - Organization of, 242-246
  - Personnel, Accomplishment of, 247-256
  - Fluctuation in Chart, 246
    - Housing Problem, 240
    - Instruction, 261
  - Regular, Organized Reserves, 240
  - Statistics, 244, 245, 246
    - Training, 241
  - School
    - Dental, 263
    - Medical, 263
      - Field Service, 263
- Army School, Nursing, 264
    - Ordnance, 264
    - Veterinary, 264
  - U. S., Strength of, 243
- Arson Laws, 111
- Art, 786
  - Bequests, 805
  - Galleries, 804-805
  - Gifts, 805
  - Institute of Chicago, 803-804
  - Municipal Developments, 115-116
    - Statistics, 116
  - Museums, 804-805
- Arts, the, 799
- Artesian Wells, 646
- Arthritis, 724
- Asia (See Foreign Trade)
  - Adult Education, 851
  - Kelley-Roosevelt Expedition, 666
- Asiatic Beetles, 713
- Astronomical Prize Awards, 581-582
- Astronomy, 575-582
  - Bibliography of, 582
- Atkinson, J. Brooks, 817
- Atlantic Mackerel Fishery, 397
- Australia, Economic Crisis, 662
  - Parliament, 500
  - Socialism, 500
  - Victoria State Election, 500
- Australian Labor Party, 500
- Australasia,
  - Ethnological Studies, 760
- Austria, Socialism, 500-501
  - Threat of Civil War in, 500-501
- Automatic Frequency Control, 602
- Automobile Deaths, Statistics of, 225
  - Production, Increase in, 432
  - Registration, Statistics of, 225
  - Taxes, 193-194
    - Excise, 194
    - Expenditures, 193
    - Registration Fees, 194
    - Revenue Receipts, 193
- Automotive Engineering, 609-614
- Aviation Act, Pension Grants, 268
  - Aerial Hook-ups with Railroads, 597
    - Industry, 453
  - Aerodynamics, 454
  - Aeronautical Board, 459
    - Progress, 634
  - Aeronautics, Army, 256
    - Fire Protection, 111
    - Government, 457
    - National Advisory Committee, 456, 457
    - Navy, 456
    - Radio, 463
  - Aerostation, 453
  - Air Commerce Act, 457
    - Army Air Corps Schools, 266
    - Coordination Committee, Advisory, 459
    - Corps, 239
      - Aims, 256
- Aviation Act, Engineering School, 266
      - Flights, 257
      - Increase in, 240
      - Material, 257
      - Personnel, 256, 257
    - Craft Accidents, 257
      - Registration, 454
      - Signal Corps,
        - Radio Service, 248
      - Types, 454
    - Mail, 456, 635
      - Routes,
        - Connects with railroad, 438
    - Marking, 456
    - Planes, Air-cooled engines, 635
      - Designs in, 635
      - Ice on, 657
      - Industries, 631
      - Production, 636
      - Standard Equipment, 635
      - Technique, 453
      - Types, Biplane, 454
        - Engine, 455
        - Monoplane, 454
    - Ports, 456
      - Of entry, 424
    - Routes, 456
    - Ship, 453
  - Ways Weather Service, 655
  - Anti-aircraft Weapons, 250
  - Army Air Corps, U. S., 456
  - Assistance in War-time, 289
  - Bureaus, Governmental, 459
  - Commercial, 258, 634-638
    - European, 636
  - Corps Air Service, 254
  - Education, 860
  - Expenditures, 157-158
  - First Air Service Established by A. Lincoln, 457
  - Flight of Yellow Bird, 666
  - Graf Zeppelin,
    - Visit to U. S., 665
  - Importance of, 282
  - Increased Passenger Service, 635
  - Insurance, 358
  - Joint Aeronautical Board, 282
  - Life Insurance, 350
  - Map Conference, 664
  - Maps of U. S., 663
  - Maya Civilization,
    - Discovered by Lindbergh, 668
  - Metal Structure, 635
  - Mimic Warfare, 289
  - National Defense, 281
  - Naval Building, 288
    - Training, 290
  - Navigation Maps, 197
  - New Airports, 636
  - Photography, 198
  - Radiobeacons, 456
  - Railroad coordination, 434
  - Schools, 258
    - of Medicine, 266
  - Service, 281
  - Severance from Army and Navy, 281
  - Statistics in Air Service, 637, 638

Aviation, Tactical School, 266
  Technical, 266
  Trans-Atlantic Flights, 665
  Use of Public Lands, 211
Axle, Front, 612
  Rear, 612

BABYLONIAN Empire, Cuneiform Material, 789
Bailey, Beulah, 178, 193
  Catherine Smith, 811
Bain, Peter, 449
Balfour Promise, 550
Bank of England,
    Discount Rate, 346
  Situation, outlook of, 333
  Taxation, 189-192
    Court Decisions in, 190-191
    Problem of, 192
    Shares of, 190-191
    Statutory Changes in, 191
Bankers Association, American Convention, 334
Banking Affairs (See Finance)
  Transactions (See Finance)
Banks (See Finance)
Baptist Communion, World Conference, 553
Bark Beetles, 390
Barley, 371, 381
Bartholomew, Harland, 124
Barton, George A., 788
Barzun, Jacques Martin, 85
Bates, Sanford, 494
  Valve Bag Co., 86
Battleships, Plans for, 614
Bauer, John, 214
Baugh, Albert Croll, 775
Baumes Crime Law, 98
Beales, Le Verne, 463
Behaviorism, 694
Belgian, Money Exchange Rates, 347
Belles Lettres, 774, 775
Bermuda, Beebe Expedition, 668
Beryllium, 682
Bill, Sheppard, 20
Binet Scale, 760, 761
Biography, 764-769
  Books on, 766
Biological Discovery, 692
  Sciences, 692
Biology, Breeding, 693
  Cellular Growth, 693
  Circulatory Organs, 698
  Glandular Control, 694
  Gland Secretions, 694
  Natural Selection, 693
  Reproductive System, 698
  Sex Determination, 695
  Tissue Transplantation, 697
Biplane (See Aviation)
Birth Control League, American, 757-758
  Rates, 736
  Registration Area Statistics, 736
  Statistics, 484
    Federal, 735
Bishops, House of, 551
Blast Furnaces, 596-597
Blood Pressure, 726-727
  Watermelon Seed Extract, 725
Blue Sky Laws (See Securities Legislation)
Bohr Theory of Electrons, 688
Bolivian-Paraguay, Dispute, 37
Bond Market (See Stock Market)
Bonds, Classification of, 165
Books, Literature on, 765
  Morals of Times, 774
  On Reading, 774
Booth, Bramwell, Death of, 558
  Visit to Japan, 550
Borah, Senator, 11, 50
  On Prohibition (See Prohibition), 16, 17
Border, Arrests and Seizures on, 474
  Commuters, 478
  Patrol, 474
Boston Basin, 647
  Fire Survey, 111
  Protestant Meeting, 557
  Regional Planning, 120
  Symphony Orchestra, 814
Botany, 705-709
  Economic, 709-713
Boulder Canyon Dam Bill, 160
    Project Act, 203
  Dam, 90-91, 203, 588-589, 684
    Bill, 608
    Developments in, 224
Box Bill, 472
Brakes, 612
Brainerd, J. G., 599
Bremen, The, 620
Briand, M. (See League of Nations)
Bridge, Cantilever, 583
  Continuous Truss, 583-584
  Eyebar Suspension, 583
  Foundations, Deep, 585
  Memphis, 585
  Over Ohio River, Steel, 583
  Prize for 1928, 584
Bridges, State Ownership of, 583
British Cabinet, Personnel of, 499
  Empire, Changes in Tariff, 317
  Labor Party, Affairs, Domestic, 499-500
    Foreign, 499
   In Municipalities, 500
   Policies and Program, 499
  Parliament, Labor Support in, 498-499
Brooklyn Garden Apartments, 506
Brown, Hugh A., 203
  Lytle, 271, 277
  Robert M., 665
Bruce Medal, 581
Bruns, Friedrich, 780
Buck, A. E., 158
Buckwheat, 381-382
Budget, 151, 158
  And Congress, 158
  Anticipated Revenues, 159
  Appropriation Bills, 160, 161
  Completion, 159
  Congressional Action on, 160
  Control, 163
    The President, 164
Budget, Coordinating Work, 163
  Estimates, 159
  Execution of, 162
  General Accounting Office, 163
  January "Business Meeting," 162
  National, 158-164
  Prohibition Fight, 160
  Report, 151
  Settlement of Claims, 163-164
  Tax Refunds, 160
Buell, Raymond Leslie, 47
Buffalo, Niagara Frontier Planning Board, 120
Building Construction (See Business)
  Trades (See Labor)
Buildings, 585-587
Bunyan, John, 779
Bureau, General Land Office, 196
  Census, 222
  Chemistry and Soils, 197
  Insular Affairs, 255
  Medicine and Surgery, 279
  Navigation, 279
  Ordnance, 458
  Public Roads, 197
  Reclamation, 20, 196
  Supplies, 279
  Yards, 279
Burgess, John W., 10
Bush, Ada L., 432
Business, 294
  Barometers of, 294
  Building Construction, 295
  Commercial Stability, 434
  Conditions, General, 294
    In Industries, 295
  Cost of Living, 433
  Effect of Boom, 532
  Factory Employment, 533
  Failures, 296
  Industrial Conditions, 432
  Labor, Increase in, 296
  Leaders, Books on, 767
  Money Markets, 297
  Prosperity in Machinery, 642
  Recession, 533
  Security Market, 297
  Statistics on Employment Increase, 533
  Volume of, 295
    Manufacturing Industries, 432
Butter, Milk and, 385-386
Butts, Allison, 418
Byrd Expedition (See Radio)
  Richard E., 665

CABINET, Ages of Members of, 67-68
  Club Membership of, 69
  College Representation in, 68
  Composition of, 67-68
  Domestic Life of, 69-70
  Members, War Experience of, 69
    Political Experience of, 68-69
    Public Service of, 68
  Organization of, 67

Cabinet, Political Aspects of Appointments, 68
  Professional Callings in, 68
Calcium Carbide Spray, 406
Calculus in Secondary Schools, 574
  Of Variations, 570-571
California Adoption, 514
  Bank Taxation, 191
  City-county Consolidation, 101
  Corporation Taxes, 189
  Criminal Procedure, 98
  Excise Tax, 194
  Federal Longshoremen Act, 539
  Gold Output, 413
  Legislative Organization, 95
  Oil Wells, 407
  Pension Law, 540
  Philosophical Union of the University of, 747
Callander, W. F., 379
Camden, Importance as Port, 231
Cammen, Leon, 590
Canada, Alcoholic Exports, (See Prohibition), 18
  Copper Output, 411
  Exchange, 347
  Geophysical features, 661
  Immigration laws, 470
  Mining productions, 415
  Nonquota immigrants, 477
  Pioneering, 661
  Radio communications
  (See Foreign Trade)
Canals, Connecting Links, 230
Canal Zone Naturalization of, 480
Canby, Henry S., 774
Canned Fishery Products, 396
  Goods, Tariff, 429
Carburetor, the Down-Draft, 611
Carnegie Cruise, 666
  Endowment, for Libraries, 797
  Institute, 803
    Of Technology, Research, 856
  Museum, Quarry Discovery, 703
Carnivorous Diet, 719
Carrier Current Telephone System, 608-609
Carroll, H. K., 542, 550, 562
Carstens, C. C., 512
Cartography, 663-665
Cast Iron Cores in Columns, 586
  High Test, 594
Casualty and Miscellaneous Insurance, 355-358
Catalysis, Heterogeneous, 672
Catholic Church, Act of Papacy, 560
    Civic Attitude, 560
    Industrial Problems, 559
    Peace Program, 559
  Movement, 552
  Political Affairs, 560
  Press, 559
Cattle, 371, 383
  Cooperative Testing, 386
  Prices, 383
  Registered, 386
Cavalry, 251
  School, 260
Cecil, Russell L., 723
Census, 6
  Agents, 80
  Bureau of, 459
  Of 1930, 471
Central America, Earthquakes, 649
  Lindbergh's flight, 668
Centralia, Power Development in, 224
Chalmers, Henry, 316
Chamber of Commerce, Health Preservation, 734
Chapman, Mariston, 971
Chart, Fluctuations in Army Personnel, 246
Chaucer, 777
Cheese, 386
Chemical Engineering, 684-688
  Industries, Commercial Developments in, 685
    Commercial Research in, 684
    Consolidations in, 685
    Economic Advance in, 684
    Mergers in, 685
    Special Construction Materials, 686
    Trade Association Activities, 684-685
  Markets, 688
  Warfare School, 244
    Service, 249
Chemicals, Foreign Trade in, 688
    Expansion in, 688
  Prices of, 688
Chemistry, 670
  Agricultural, 677-681
  Industrial, 684-688
  Organic, 673-677
Chicago, Art Institute, 803-804
  City Planning, 125
  New Buildings, 809
    Opera House, 813
  Police Instructions, 114
  Regional Planning, 121
  Symphony Orchestra, 814-815
  University of, Expedition, 703
    Rockefeller Gift for Research, 856
  Zoning, 123
Child Crime Study, 514
  Employment Conditions, 512-513
  Guidance Clinics, 496
    In Mental Health, 511
  Health Supervision of the School, 733
    Underweight Measurements, 733
    White House Conference on, 496, 503, 515
  Labor Committee, National, 526
  (See Labor)
  Welfare, 512-515
Children, Protective Laws for, 513-514
Chile, Accepts Settlement on Tacna-Arica Dispute, 38
Chile, Neolithic Research, 759
China, Agreement with Japan, 41
  America's Relations with, 36
  Difficulty with Russia, 41
  Extra-Territorial Privileges, 42
  Industrialization, 662
  Primitive Man, 759
  Revolution in, 40, 41
  Tariff, 40
    Relations with, 30
Chinese Admissions, 473
  Citizenship Claims, 473
Chittenden, F. H., 716
Chrome Plating, 594-595
Chromium, 683
  Electrolyte, 683
  Plating, 250
    In Diesel Engines, 593
Chromosomes, Sex Determines, 692
Chronology, Financial Events, (See Stock Market)
Church, Earl D., 267
  Czarist, Russian, 561
  Government Relations, 550, 551
  Roman Catholic, 558-561
  Russian, Conflict with Soviet, 561
  Schools (See Education)
Churches, Orthodox, Oriental, 561, 562
  World Conference of (See Religion)
Cincinnati, Government of, 103-104
  Orphan Asylum, 514
Circuit Breaker, New German, 604
Circulation of Blood, 719-720
Cities Experimental Station, 706
  Indebtedness of, 177-178
    Statistics, 178
Citizenship, 479-483
  Acquirement of, 479
  Status by Naturalization, 479
  Training, 483
City Finance, 175-178
  Manager Government, 105-106
  Planning, 124-125
  Plans, 121
  Politics, 103-104
Civic Association, American, 117
  Conferences, 117
Civil Service Assembly Research, 78
  Commission, Federal, 79
  Federal, 77-83
Civilian Rehabilitation (See Education)
Civilization, Greek, 788
Clark, Lindley D., 527
Clark, W. T., 716
Classical Investigation, 783
Cleveland Council-Manager Plan, 105
  H. Burdett, 232
  Symphony Orchestra, 815-816
Climatology, 655-658

Clutch, 611
Coal, 202, 404-406
  Carbonization Process, 405
  Improved Situation, 402
  Industry Labor Problem, 404
  Mining Facilities, 404
  Problem, 316
  Pulverized, 592-593
  Stripping, 405
Coast Artillery School, 261
  Survey, 196
Codling Moth, 389
Coffee Drinking, 719
Coke, 404-406
Cole Prize, Frank Nelson, 574
College Athletics (See Education)
Colorado, Employment, 539
  Production of Gold, 414
Columbia, District of (See Prohibition)
  University, Cooperative Studies, 854
    Expeditions, 667
Combustion Chambers, 609
Cometary Spectra, 578-579
Comets, 578-579
  Brightness of, 579
Commerce, Bureau of Domestic, 457
    Foreign, 457
  Coastwise, 276
    Statistics, 276
  Department of, 73-74
  International, 53
    Waterway, Statistics, 276
Commercial Aviation (See Aviation)
  Bribery, 88-89
  Fisheries, 396
Commission Law Enforcement (See Prohibition), 15
  Public Service, 214,217
Commodity Futures, Market, 32
  Prices, 391-392
Commonwealth and Southern Corporation, 218
Communion, Anglican, 551
Community Chest Campaigns, 503
Compensation Act, Adjusted, 270
  Adjusted, Statistics of, 271
Compression Ratios, 609-610
Comstock, Alzada, 192
Concrete and Steel Framing, 586
  Arches and Dams, 588-589
  In Engineering, 627
Cone, Edwin F., 415
Conference, Coolidge Naval, 48
  Conciliation, Pan-American, 13
  Import and Export Prohibitions, 53
  London Naval, 48
  Naval, 7
    Limitation, 9
  On Arbitration, 37
  Safety at Sea, 48
  World Disarmament, 52
  World Economic, 54
Configurationism, 752
Congregational Churches (See Religion)
Congress, Affiliations, Professional, 60-61
    Religious, 62
  Age Factors of, 59-60
  And Its Functions, 1-6
  Appropriation Bills, 161
  Appropriations by Statistics, 161
    For Floods, 7
    Of Statistics, 161
  Budget, the, 158, 160
  Composition of, 59
  Conflict with, 11
  Educational Equipment, 60
  Environment Factors of, 59
  Fraternal Affiliations, 62
  Literary Men in, 62-63
  Navigation, 8
  Personnel of, 1929-1930, 59-67
  Political Experience, 61
  Porto Rican Hurricane Commission, 132
  Problem of Flood Control, 640
  Radio Act, 8
  Seventieth, Legislation on Pensions, 268
  Special Session, 3
    Farm Relief, 11
  War Veterans, 62
Connecticut, Administrative Reorganization, 97-98
  Child Labor Committee, 525
  General Elections, 95
  Securities Legislation, 324
Conover, Milton, 59, 67
Conversations, MacDonald-Hoover, 52
Cook Anniversary, Captain, 129
Coolidge, Calvin, 9
    And World Court, 34
    Pan-American Conference on Conciliation, 13
  Naval Conference, 48
  President, 50, 51, 158, 159, 160, 162
Cooper, John William, 858
Cooper-Hawes Act, 8
Cooperite, 654
Copper, 409-412, 653
  Electrolyte, 683
  Increased Output, 401
  Milling, 410
  Mining, 410
  Price, 410
  Production, 411
  Resolution, 32
  Shares (See Stock Market)
  Smelting, 409, 411
  Statistics of production, 409
Corn, 380-381
  Borer, European, 714
  Crop Conditions of, 380-381
  Improvement, 711
  Meteorological Influences, 657
  Production, 370-381
  Quality and Carry-Over, 381
Cornell University, Scientific Fields, 854
Corporation Income Tax Provisions, 186
  Taxation, 189-192
  Taxes, Court Decisions in 189-190
    Statutory Changes in, 189
Corrupt Practices Act, 94
Cotton, 391
  Acreage, 379
  Crops, 379-383
    Statistics, 382
  Ginnings and Total Crop, 379
  Index Number of Farm Prices of, 383
  Pink Boll Worm, 714
  Production, 371, 379
  Value of, 379
  Yield by States, 379-380
Council Manager Plan, 104-105
Counterfeiting, 52-53
Counties, City Manager Plan, 105
  Manager Plan for, 100
County and Rural Government, 99-102
Court of Appeals of the District of Columbia, 84
    Of the United States, Circuit, 84
  Claims of the United States, 84-85
  International Justice, Permanent, 47
Couzens Fund, 514
Covey, Arthur, 802
Cows, Number and Production of, 386
Cox, Douglas F., 353
  Philip, W. L., 830
Crankcase and Cylinders Unit, 610
Crime Conditions in the United States, 488-491
  Reporting System, 107
  Surveys, Detection, 495-496
    Kansas City, 112-113
    Prevention, 495-496
    State, 491
  Wave, the chronic, 488
Criminology, Research in, 490-491
  University Projects, 491
Crist, Raymond F., 479
Criticism, 774, 775
Crop Conditions, 370-371
    Drought, 370
  Improvement, 712
  Yields, 370
Cropped Area and Value, Statistics of, 207
Crops, Field, Russian, 709
Crude Materials (See Foreign Trade), 306
  Oil, Development, 407
    Imports, 408
    Prices, 408
    Production of, 314
Cruiser Bill, 160
    Construction of, 7
      (See Navy)
  German, 618
Cruisers, Light, 614
Crusade Period, Literature, 790
Cuba, American Property Rights in, 149
  Defamation Charges, 149
Cucurbocitrin, 727
Cumming, H. S., 47
Cunningham, Harry Francis, 809
Curtis, Vice-president, 2

- Customs, Administration of, 426
  - Bureau, Work on Prohibition (See Prohibition)
  - Duties, 424
  - Functions, 424
  - Procedure, 425
  - Truce, 53
  - Violations of, 425
- Cutting Materials, 593-594
- Cutworms, 389
- Cyclones, Tropical, 658
- Cylinder Development, 609
- Cytological Publications, 708
- Cytology, 700
  - Chromosomes, 696
  - In Plants, 708
  - Sex Determination, 700
- Cytoplasm, 691
- Czecho-Slovakia, Socialism, 501

- DAIRY Exposition, 387
  - Herd improvement, 386
  - Industry, 372, 385-387
  - Plant Consolidations, 387
  - Research, 386
- Dam Construction, 595-596
- Davis, Herbert H., 728
- Dawes, Charles G., 14
  - Mission, 149
  - To Dominican Republic, 39
  - Plan, 14, 48
  - Statement of, 149-150
- Dawson, J. A., 699
- Dearborn, Ned H., 858
- Death, Causes of, Statistics, 737
  - Rates, 737
  - Registration Area, Statistics, 735, 738
  - Statistics, 484
- Debentures Plan (See Farm Relief), 3, 4
- Decarbonizing, 610
- Defense and Armaments, 238
- Deion Circuit Breaker, 603-604
- Delaware Amendment, 92
- Delinquency, Industrial Causes of, 496-497
  - Preventative Work in, 495-498
  - And Prohibition, 497
- Dellinger, J. H., 459
- Demonstrative Geometry in Ninth School Year, 533-574
- Denominational Activities, Protestant, 551-558
- Dental Care, Cost of, 731
  - Clinics, 731
  - Decay, Study of, 732
  - School, Army, 263
  - Science, Progress in, 731-732
- Dentistry, 730-732
  - Community, 731
  - Criticism, of, 730
  - In Relation to Health, 732
  - Remedial Plans for, 730-731
  - Restorative, 732
- Dentists, Medical Training for, 731
- Deportees, Reentry of, 478
- Destroyers, Recommissioned, 615
- Detroit-Canada Vehicular Tunnel, 589-590
  - Condemnation Commission, 116
  - Government of, 103
  - Symphony Orchestra, 815
- Dewey Celebration, 746, 859
  - John, 740, 741
- Diamond Market, Governmental Control, 316
- Dictionary of American Biography, 756
- Diesel Engines, 593
    - Materials for Construction of, 593
  - Freighter, 619
- Diet, 718-719
- Digestion, 718-719
- Digestive Organs, 696
  - Tract, 718-719
- Diplomatic Personnel, 27
- Disarmament, 52
- Diseases and Pests of Animals, 387-388
- District of Columbia, 134-138
  - Acquisition of Land, 137
  - Board of Education, 135
  - "Diploma Mill," 136-137
  - Medical Practice, 135-136
  - Minor Acts, 137-138
  - Settlement Act, 134-135
  - Submetering, 608
  - Tax Collections, 135
- Diteman, Urban F., 666
- Divorces, Classification of, 486
  - Statistics, 485
- Division V, Municipal Government, 103
- Dominican Republic, Budget System, 39
  - Dawes Mission, 149
- Doran, Commissioner (See Prohibition)
  - Investigation, 222
  - Report (See Prohibition), 18
  - Study, Analysis of, 223
- Drama, 776, 777
  - Elizabethan, 778
  - Seventeenth Century, 778
  - (See Theater)
- Droste-Hülshoff, Annette von, 781
- Drug Addicts, 510-511
- Druses, The Origin of, 790
- Duke University, 557
- Dunn, Thomas A., 22
- Dyer, H. G., 716

- EARTH, Magnetism Studies, 659
  - Quakes, 647-650
    - History of U. S., 649
    - Research, 649
- Ecology, 708, 710
- Economic Botany, 709-713
    - Changes, Committee on, 633
    - Conference, World, 54
- Economics, Business, 294
    - History of, Literature of, 765
  - International, 52
- Economy Clubs, 102
- Edison Anniversary, 609
- Education, 827
  - Act, National, Vocational, 846
    - George Reed, 846, 847
  - Adjustment, 831
  - Adult, 851-854
    - Activities, 852
    - Aims, 851
    - American Association, 852
    - Bibliography, 854
    - Colleges, Summer Sessions, 852
    - Contributing Agencies, 851
    - Journal for, 852
    - World Conference, 851
      - Movement, 851
  - Agriculture, 847
  - American Council on, 858
  - Associations, 859
  - Aviation in, 860
  - Bar Admission, 837
  - Bibliography on, 835
  - Church Schools, 835
  - College Athletics, 836
  - Collegiate, 832-837
    - Alumni, 853
  - Commissioner of, 858
  - Committee, National, Report, 827
  - Conferences, International, 859
  - Continuation School, Part-time, 845
  - Elementary, 827-830
    - Objectives, 829
    - School, Activities, 827
  - Engineering, 839
    - Economics, 840
    - Enrollment, 839
  - Engineers, Summer School, 839
  - Evening Schools, 845
  - Expenditures, opposition to, 831
  - Fellowship, 859
  - Financial Data, 836
  - Health, 859-860
  - High School Vocational Work, 845
  - Higher Adjustment Problem, 833
    - Cooperation, 832
    - Journal of, 835
    - Standards, 835
    - State Systems, 832
  - Home Economics, 848, 849
  - Industrial, Part-Time Courses, 848
  - Institutions, Community Interests, 834
    - Research, Aims in, 855
      - Grants, 856
    - State Control, 833
  - Jewish, 563, 564
  - Law, Research in, 837
    - Statistics, 837
  - Legal, 837
  - Library Service, 793
    - Surveys, 793
  - Medical, 838
    - Licensure, 839
  - Military, 258-266
  - National Advisory Committee of, 858
  - Naval (See Naval Education)

Education, New Conception, 828
  Opportunity Schools, 848
  Oregon Law, 833
  Problems in, 832
  Professional, 837
  Public School, 835
  Publications, 829
  Radio in, 860
  Roman Catholic Church, 558-559
  Scope of Movement, 851
  Secondary, Growth of Schools, 831
    Problems, 830
    Scope, 830
  Student Aims, 828
  United States Office of, 858
  Teachers, 840
    Pupil Relation, 828
    Training, 849
      Conference, 841
  Vocational, 842-850
    Adult, 844
    Appropriation, 8
    Civilian Rehabilitation, Problems of, 850
    Classification, 844
    Federal Aid, 847
    Legislation, 846
    Occupational Spread, 843
    Social Function, 842
    Unemployed Groups, 844
Educational Administration, 860
  Civic Associations, 859
    Research in, 854-857
      Bibliography in, 857
      Fellowship in, 856
  Leaders, Books on, 768
  Learned Associations, 859
  Miscellaneous, 858-860
  Research, 829
Edwards, Gurden, 331, 334
Egg Products, Tariff on, 428
  Storage, 678
Egypt, Archaeological Discoveries in, 799-800
  Change in Government, 43
  Church and State, 551
  Nile Agreement, 43
  Publications, 788
  Relations with England, 43
Eighteenth Amendment, 10
Einstein, 575, 577, 590
Eisenhower, M. S., 376
Ekblaw, W. Elmer, 650, 660
Elections, 1929, 21, 22
Electoral Laws, Changes in 93-95
  Provisions, 93
Electric Arcs, Flames from, 682
  Drive for Ships, 607
  Firing of Ceramics, 682
    Glass, 682
  Furnaces, 597, 682
    Improvements in, 682
  Light and Power Industry, 217, 222, 233-237
      Statistics of Growth, 234
  Motors, 607
  Power Shovels, 605
  Transportation, 607-609
  Welding, 609
Electrical Engineering, 599-609
Electrical World, 218
Electricity, Federal Regulation, 217
Electrification of Railroads, 607
Electrochemical Industries, Power for, 684
Electrochemistry, 681-684
  Gases, 684
  General Developments of, 681-682
  Organic, 683-684
Electrolytes, Aqueous, 683
  Fused, 682-683
Electrons, Capture of, 688-689
  Diffraction of, 689-690
Elementary School (See Education)
Elevator Control, 605
Elliot, 2d, Charles W., 119
Ellis Will, 514-515
Elsasser, Albert, 774
Ely, Mary L., 851
Embryology, Fetal Membrane, 697
  Hereditary Factors, 700
Emotional Behavior, 718
Employment, 532, 533
  Juvenile, 848
Endocrine Glands, 696
    Relation of Hormones, 699
Engines, 609-611
  Body Design, 613-614
  Control of, 613
  Cooling of, 610-611
  Equipment of, 613
  Fenders, 613
  Frame of, 613, 614
  Headlights of, 613
  Oil Capacities of, 610
  Radiators, 613
  Roof Treatment, 614
  Seats, 614
  Springs, 614
  Tank Capacity of, 611
  Trends in Design of, 609
  Windshields, 614
Engineer Corps, 256, 273
Engineer School, 262
Engineering, 219, 583
  Automotive, 609-614
  Books on, 768
  Buildings, 840
  Chemical, 684-688
  Congress World, in Tokio, 221
  Education (See Education)
  Electrical, 599-609
    Apparatus and Equipment, 603-605
    Cable Protection, 603
    Independent Protection, 605
    Instruments and Measurements, 605-606
    Legislation and Investigation, 608
    Motors, 605
    Progress in Unit System, 605-606
    Recording Transient Power, 606
    System and Plant Economy, 599-601
Engineering, Transmission, 602-603
  Employment Adjustment, 598-599
  Foreign Patents, 597
  Heat Treatment, 626
  Highway, 226
  Marine, 614-618
    Commercial, 618
    Machinery, 620
  Materials, 594-595, 622-630
  Mathematics, 572
  Mechanical, 590-599
  Metals in, 623
  Mineral Aggregates, 628
  Mississippi Problem, 641
  Railroad, 597-598
  Refrigeration, 595
  Standardization, 630
  Structural, 583-590
  Use of Brick, 628
    Concrete, 627
  Testing, 629, 630
England, Archaeological Discoveries in, 801
  Methodist Churches, Union of, 557
Entomological Society of America, 712
Entomology, 712-716
  Bureau of, 458
  Publications, 715
  State Board, Personnel, 716
Environment, Mental, 703
Ephedrine, 676
Epigraphy, 785
Epinephrine, 726-727
Episcopalians, Union of (See Religion)
Epistomology, 742
Essay, Literary, 775
Ethics, 741-742
Ethnology, 758-760
Ethylene and Its Derivatives, 675
Etiology of Neoplasms, 721-722
Eugenics, 757
Europe (See Foreign Trade)
  Adult Education, 851
  Changes in Tariff, 317
  Economic Strength, 662
  Neolithic, 759
  United States of, 53
European Corn Borer, 389
Evangelical Churches, 562
  Congress, Latin-American, 548
Evolution, Organic, 692-695
Executive Services, Miscellaneous, 76
Expenditures, National, 151-158
Exploration, American, 665-668
Export Balance, 430-434
Exterritoriality, 57

FALCONER, DOUGLAS P., 495
Fall Conviction, 88
  Sinclair Case, 88
Farm Land Values, 373
  Mortgage Debt, 369
  Relief, 1, 7, 11, 313
    Action in House, 3
    Bill, 4

- Farm Land Relief, Coalition, 3
    - Experts, 80
- Farmer's Cooperative Association, 390-391
- Farming, Mechanical Evolution in, 373-375
  - Standards in, 631
- Fats, 679
- Federal Administrative Organization, 70-77
  - Child Labor Amendment, 525
  - Civil Service, 77-83
    - Character Investigations, 80
    - Commission, 79
    - Executive Employees, 79
    - Miscellaneous, 83
    - Organization, 79
    - Personnel, 83
    - Selection, 80
    - Professional Recruiting, 79
    - Prohibition, 79
    - Publications, 83
    - Ratings, 79
    - Transfers, 80
    - Veterans, 79
  - Convict Labor Law, 519
  - Council of Churches, 546
  - Estate Tax, 192
  - Expenditures, 170-171
  - Farm Board, 3, 7, 313, 390
    - Appropriation for, 162
  - Highway Act, 440
  - Judicial Prosecutions, 85-89
  - Legislation, 6-9
    - Health, 734
  - Maps, 196-199
  - Powers Commission, 10
    - Projects, 237
  - Reserve Act, 335
    - Bank, Changes in Membership, 338
      - Governors, 338
      - Loans, 336
    - Banks, Statistics of Resources and Liabilities, 338
    - Board, Warning, 335
    - System, 334-339
      - Credit Policies, 334
  - Surveys, 196-199
    - Trade Commission, 88, 219, 608, 685
      - Inquiry into Utilities Status, 236
  - Water Power Commission, 606-607
- Federation of Latin-American Churches, 548
- Felt, E. Porter, 712
- Femat's Last Theorem, 570
- Fertilizers, 687
- Fess, Simeon, 2
- Field Artillery, 252
    - School, 261
  - Expeditions, Discoveries, 703
  - Museum Natural History, 666
- Filipino, Immigration of, 470
- Finance, 294
  - Bank Failures, 332
  - Banking Affairs, 331-334
    - Check Transactions, 303
- Finance Banking, Transactions, Volume of, 303
  - Banks and Trust Companies, 339
    - Chain, 331
    - Classification, 331
    - Resources of, 331
      - National, 339
  - Brokers' Loans, 431
  - Check Transactions, Statistics of, 304
  - City, 175-178
  - Foreign Debts, 8
  - Money Rates, 294
  - President's Fiscal Policy, 158-159
  - School, 262
  - State, 170-175
    - Commercial Banks, 341
  - Statistics of Bank Loans, 336, 337
    - Of Gold Stock, 339
    - Resources and Liabilities of Banks, 343, 344, 345
      - National Banks, 340, 341, 342
  - Tax Reduction, 8
- Financial Events, Chronology of (See Stock Market)
  - Taxes, 179
- Fine, Henry Burchard, 575
- Fink, Colin G., 681
- Finland, Classification Map, 665
- Fire Insurance, 352, 353
    - Liabilities and Income, 352
    - Rates, 110-111
    - Volume, 352
  - Loss, National, 110
    - Reduction, 11
  - Prevention Colleges, 111
  - Protection, 109-112
    - Improvements, 111-112
  - Waste Council, National, 110
- Firemen, Courses for, 112
  - Propagation, 399
- Fisher, Irving, 15
- Fisheries of the United States and Alaska, 396-399
      - Statistics, 398
    - Conservation, 398-399
- Fiske, Haley, 352
- Fission, Regeneration in animals, 702
- Flax, 371
- Flaxseed, 382
  - Oil, Tariff on, 428
- Fleet, United States, 280
- Flint, Ralph, 805
- Flood Areas, Aid in, 7
  - Control Act, 638
- Florida, Excise Tax, 194
  - Voting Requirements, 93
- Fluctuations in Army Personnel, Chart, 246
- Fluorine Gas, 683
- Foods, 678-679
- Forbes and Neujmin Comet, 578
- Foreign Concessions, 57
  - Currency Market, Changes in, 346
  - Debt Payments, 168, 169
- Foreign Debts, Average Interest Rates, 167-168
    - Classification of, 168-169
    - Funded Principals of, 169
      - Statistics, 169
    - (See Finance), 8
    - To the U. S., 167
  - Exchange, 346, 347
    - Factors in, 432
    - Rates, 346
  - Fishery Trade, 396
  - Indebtedness to the United States, 169
    - Statistics, 170
  - Ministers, 28
- Science, Administrative Board, 25
    - Duties of Officers, 25
    - Officers, Statistics of Salaries, 27
    - Personnel, 26
    - United States, 24-28
  - Trade, 304-308
    - Balance of, 305
    - Crude Materials, 306
    - Cuban Export Control, 315
    - Excess of Exports, 430
    - Exports, 305
      - Geographical Distribution, 307
    - Imports, 305, 306
      - Geographical Distribution, 307
    - Loan Factors, 431
    - Restrictions, 50
    - Statistical Review, 430
- Forest Depletion, 394
  - Fire Protection, 395
  - Light, 711
  - Protection, 395
  - Service, 196
- Forestry, 394-395
  - Acts, 377
  - Administration Expenditures, 395
  - Taxes, 180
- Fort Leavenworth, 495
- Fort Worth, Tex., City Planning, 125
- Fox, William, 822, 823
- France, Archaeological Discoveries in, 801
  - Rate of Franc, 346
  - Socialism, 501
- Fraunhofer Lines, 576, 578
- Freeman, Frank N., 760
- French Debt, 155-156, 167
- Friends, Society of, 555
- Frozen Fish, 396
  - Fruits, 392-393
- Fruit, 391
  - Crops, 392
  - Industry, 372
  - Production, 371
- Fuel Compounds, 592
  - Power and Efficiency, 591
  - Systems, 611
  - Utilization, 591-593
    - Improved Methods of, 591-592
- Fuels for Railroad Engineering, 598
- Fumigants, 680-681

Functions of Congress, 1-6
  Navy, 282-284 (See Navy)
Furlong, W. R., 141
Future Markets, Cotton, 322
    Need of, 322
    Scope of, 321
    Significance of, 321
  Trading, Price Manipulation, 322
    Public Control of, 321-323

GALAPAGOS, Expedition to, 668
Ganoe, William A., 238, 242, 247, 258
Gas and Electric Co., Associated, 219, 235
Gasoline Consumption, 225
  Increased Volume, 407
  Tax, 179-180
    Rate of, Statistics, 174
Generating Capacity of Turbines, 600-601
Generator, The Double-Winding, 601
Genetics, Publications on, 708
Geneva, 9, 47, 51, 48, 49
  Conference of Signatories, 34
  Reduction of Armament, 35
  Slavery Convention, 30
Geodetic Survey, 196
Geography, Economic, 660-663
    Bibliography, 663
Geologic State Maps, 664
Geological Survey, 196
  State, 199-202
Geology, Bibliography, 647
  Dynamic, 646, 647
  Economic, 650-653
  Equipment, 651
  Publications, 651
  Rock Analyses, 650
  Structural, 646, 647
Geometry, College Entrance Requirements in, 574
Geophysical Instruments, 646
  Prospecting, 403
  Sciences, 646
  Work, American, Meteorology, 656
George A. Posey Tube, 589, 590
George Reed Act (See Education)
German Dye Trust, 685
Germany, Archaeological Discoveries in, 801
  Reichsmark, 347
Gibson, Ambassador, 47
  Hugh, 9, 12
Glasgow, Ellen, 771
Glossbeimer, Alfred M., 22
Goethe, 780
Gold, 412-415
  As Commodity, 431
  Harry, 726
  Movement, 430
  Production, 412
  Value of, 413
Goldenweiser, E. A., 334
Goodrich, Ernest P., 225
Gove, George G., 504
Government, County and Rural, 99-102
  National, 59
  Relations with Church, 550
  Types of Municipal, 104-106
Governmental Functions, 151
Governors, Western Conference of, 90
Graber Case, 89
Grace Line, 619
Graf Zeppelin (See Aviation)
Grain Corporation, National Farmer's, 391
  Cotton Crops, 379-383
  Index Number of Farm Prices of, 382-383
  Production, Decrease in, 379
  Sorghums, 382
  Statistics in the U. S., 382
Grasshoppers, 389
Great Britain's Debt, 167
    Labor Ministry, 498
    Socialism, 498-500
  Lakes Decision, 91
  Western Sugar Co., 86
Greece, Archaeological Discoveries in, 801
  Health Administration, 734
  Liquor Smuggling, 30
  New Loan, 168
Greenland Expedition, 655
Gregory, William K., 667
Grundy, Joseph K., 2
Guam, Agriculture, 144
  Education, 144
  Government, 143
  Health, 144
  Population, 143
  Shipping, 144
Gudmondite, 654
Guild, Frederick H., 91
Gulf States, Oysters and Shrimps, 397
Gulick, Dr. Luther, 106, 107
Gum Infection, 732
Gypsy Moth, 714

HAEMATOPHANITE, 654
  Hague Conference on Debts and Reparations, 499
Haiduck, Andrew F., 634
Haiti, Conflict in, 39
  Disturbance in, 36
Hall, Mordaunt, 821
  Ray, 430
  R. Dawson, 404
Halogen Oxides, 671
Hankins, Frank H., 753
Harbors, 227-231, 271-276
Harding, Warren G., 49
Hardy, Edward R., 352
Harrison, George L., 338
  William B., 22
Hart, James, 9, 13
Hartington Case, 222
Harvard, City Planning, 124
  Expedition, 703
  Institute of Comparative Law, 855
  University, Expedition, 667
    Law School, 497
Hawaii, 127
  Economic Conditions, 130-131
  Education, 130
  Exports of, Statistics, 131
Hawaii, Finances, 129-130
  Government, 129
  Health, 130
  Population, 129
  Races, Statistics, 130
  Transportation, 130
Hawley Bill, 11
Hayes, H. K., 709
Hazard, Daniel L., 658
Health Administration, Public, 734
  Legislation, Federal, 734
  Preservation, 734
    U. S. Chamber of Commerce, 734
  Public, 732-735
    Bibliography of, 734-735
  Supervision, 733
  Stations for Children, 513
Heat Control Valve, Automatic, 611
Hebbel, Friedrich, 781
Hebrew Union College, 563
Heimwehr, 501
Hemingway, Ernest, 771
Henderson, Frances M., 802
  Charles W., 412
Henri, Robert, 805
Heredity, 702
Hessian Fly, 389
Highways and Motor Roads, 439-442
  States, 442
  Statistics of, 441
Hill, Charles E., 146
Hines, Frank T., 268
Hiscock, Ira V., 732
Histogenesis, 697
History, 764-769
  Greek, 787
  Literature on, 764
  War-time Literature on, 765
Hocking, E. W., 741
Hog Cholera, 388
Hogs, 371
Holland, Rate of Guilder, 347
  Tube, 589, 590
  Tunnel (See Motor Bus)
Home Economics (See Education)
Homicide, 488-489
  Statistics, 489
Hoover Administration, 48
  President, 1, 36, 49, 52, 53, 67, 70, 90, 91, 106, 148, 149, 494, 499
    Annual Message, 13
    Armistice Day Address, Freedom of Seas, 12
    Attitude on Stock Market (See Stock Market), 13
    Calls Conference, 644
    Child Health, 496, 503
    French Debt, 155-156
    Good Will Trip, 36
    Immigration, 471
    Inaugural Address, 3
    Kellogg Pact, 31
    Message to Haiti, 39
    National Commission on Law Observance and Enforcement, 490
    On Banking, 332
    Political Creed, 9
    Prohibition Commission (See Prohibition), 15

Hoover, President, Protocol, 52
  (See President), 9
  Tacna Arica, 38
 Thomas N., 21
Hormell, Orren C., 99
Horn, Robert Chisolm, 785
Horse Breeding, 247
Horses, 384-385
Horticultural Storage, 393
 Transportation, 393
Horticulture, 392-393
Hosic, James F., 827
"Hot Pursuit," Doctrine of, 147
House, Composition of, 59
 Leadership, 2
 Of Representatives, Members of, 64-67
  Election in, 21
  Reapportionments, 6
Housing, 504-510
 For World War Veterans, 505
Hubbard Survey, 125
Hudson River, Port of Entry on, 231
 Suspension Bridge, 586
Huebner, S. S., 294, 297, 303
Hughes, Charles E., 35, 51, 91
Hulin, Wilbur S., 747
Hull, Harry E., 475
Humanism, 743-744
Humanitarian Work, 515
Humanities, The, 764
Hungary, Archaeological Discoveries in, 801
Hunter, Merlin H., 151, 170, 175
Hurd, Charles D., 673
Hyde, Arthur M., 369
Hydraulic Machinery, 595-596
 Shock Absorbers, 613
Hydrocarbons, 674
Hydrogen, Molecular, 670, 690
Hydrographic Office, 196
Hygiene, Public, 732-735
Hyperparathyroidism, 724-725
Hyslop, J. A., 388

IDAHO, Silver Output, 414
 Local Administration, 182
Illinois, City Manager Government, 106
 Council Manager Plan, 104-105
 Crime Survey, 498
 Criminal Procedure, 98
 Employment, 539
 Labor, Child, 525
 Municipal Home Rule, 108
 Nominations, 94
 Reapportionment, 95
 Securities Legislation, 324
Illumination, 608
"I'm Alone" (See Prohibition), 14
 Case of, 146
Imagery, 750
Immigrants, Nonquota, 476-477
 Quota, 476
 Restriction of, 471
Immigration, 89
 Act, 483
 Admissions, 472
Immigration, Analysis of, 472-473
 Classification of, 472-473
 Departures, 472
 Family Considerations in, 475
 Law Administration, 474-475
  Amendments to, 475
  Restrictive Effects of, 473
 Losses, Statistics, 476
 Policy, Pan-American, 470-471
 Problems, 472-475
 Quota Gains, Statistics, 476
  Limitations on, 475
 Races and Population, 469
 Racial Aspects of, 469
  Selection of, 471
 Selective Principle in, 475
 Service, Cost of, 478-479
 Sources, 473
 Visas, 483
Immortality, 744-745
Import Balance, 430-434
Inaugural Address, Prohibition Enforcement, 10
Incandescent Lamp, Invention of, 234
Income Taxes, 185-188
  Court Decisions, 186, 188
  Exemption Provisions, 186
  Federal, 185-186
  Residence Provisions, 186
  State, 186-188
India, Union of Churches, 548
Indian Affairs, Office of, 196
 Service, 208
Indiana, Employment, 539
Indianapolis, City Manager Government, 105
  Council-Manager Plan, 105
  Government of, 103
Indo-European Linguistics, 790
Industrial Causes of Delinquency, 496-497
 Chemistry, 684-688
 Shares (See Stock Market)
 Standardization, 630-634
 Taxes, 179
Infant Mortality, 513
Infantry, 251
 Correspondence Course, 260
 Schools, Service, 259
Ingalls, Walter Renton, 417
Inheritance, Mental, 763
 Taxes, 179, 192-193
Inland Waterways Corporation, 438
  Rates, 230
  Revenue, 230
Inorganic and Physical Chemistry, 670-673
Insect Pests, 388-390
  Biological Control, 715
 Control of, 7
  Cooperative, 714
Insecticides, 680-681
Institute of Applied Lighting, 608
 Criminal Law, 497
 Human Relations, 498, 515, 756, 757
 Pacific Relations, 42, 56-57
  Biennial Conference of, 56
Institute of Applied Lighting, Politics, 54
  Conferences, 55, 56
  Economic Division, 54
  Financial Division, 54
 Lecture Courses, 55
  Political Division, 55
   Factors, 54
  Topical Division, 54
 Social Law, 497-498
Insular Affairs, Bureau of, 255
 Possessions, 238
Insulation, 603
Insurance, Automobile Installment Plan, 355
  Liability, 357
 Casualty and Miscellaneous, 355-358
 Companies, Consolidation, 352
 Fire, 352
 Government, 270
 Group Life, 530
 Life, 348-352
 Marine, 353-355
 New Laws, Application, 357
 State Laws, Amended, 539
 Unemployment, 523
 Workmen's Compensation, 358, 538-541
Inter-American Arbitration, Treaty, 37
 Conference, Washington, 36
Interborough Rapid Transit, 222
Interdenominational Activities, 542-550
Interior, Department of, 75-76
Internal Commerce, Conditions of, 432
International Boundary Commission, 196
 Conferences, 47-48
  American Participation in, 47
  Arbitration and Conciliation, 150
  Safety of Life at Sea, 146
 Congress on Mental Hygiene, 510
  Psychology, 747-748
 Education Conferences, 859
 Justice, Permanent Court of, 47
 Law, 53, 54
 Physiological Conference, 717
 Situations Affecting the United States, 24
 Society of Sugar Cane Technologists, 677
 Standard Associations, 630
 Trade Control, 316-320
Interracial Conference, National, 758
Interstate Commerce Commission, 86
Intra-Coastal Canals, 227
Invertebrate Zoology, 699-702
Investment Trust, Evolution of, 326
  Future Outlook, 330
  Incorporated, 328
  Relation to Stock Market, 329
  Sound Managament, 330
  (See Stock Exchange)

Investment Trust, Uniform Trust Funds, 327
  United States, 326-330
  Varieties of, 327
Iodine, 722
  Foods, 678-679
Iowa, Bank Taxation, 191-192
  Securities Law, 324
  State Board, 181
Ireland, Early Man, 758
Iron, 415-417
  Industry, 596-597
    Cast, used in engineering, 623
  Manufacture of, 422
  Pig, Production of, 415
  Stainless, 416
  Surface Reaction, 672-673
Iraq, Northern British American Expedition, 668
  Publication on, 789
Irrigation, 203-208
Isotopes, 670-671
Italy, Archaeological Discoveries in, 801
  -Vatican Accord, 45-46

JANSSEN Medal, 581
  A. H., 618
Japan, Armament Reduction, 42
  Open-Door Doctrine, 42
  Ratifies Kellogg Treaty, 42
  Religion, 549
Japanese Beetle, 389, 713
Jemez Canyon, Archaeological Discoveries in, 799
  Province, Archaeological Discoveries in, 799
Jensen, Jens P., 181, 189
Jerusalem, Wailing Wall, 550
Jewish Communal Affairs, 562
  Philosophy, 746
Joerg, W. L. G., 663
Johns Hopkins, Gifts for Research, 857
  Institute of Law, 855
  Medical School, 839
  University, 497-498
Joint, Universal, 612
Joints, 612
Jones Act, 20
  (See Prohibition), 8
  Ernest, 453
  Senator, 2
  -Stalker Act, 87
  -White Act, 615
    (See Shipping)
Journalism, 777
Judaism, 562
Judicial Activities, 85
  Council Movement, 98-99
  Prosecutions, Federal, 85-89
Judiciary Personnel of, 84-85
  State Administration and, 97-99
Julienita, 653
Jupiter, 579
Jurisdiction, Maritime, 146-147
Jurist's Committee, 51
Justice, Department of, 72-73, 80
  Reform of American, 497

KANSAS, Blue Sky Law in, 324
  City
    Crime Survey, 112
  Education in, 834
  Reapportionment, 95
  Tax Commission, 181-182
Katina," "The, 147
Kellogg, 32
  Note, 34
  Pact, 13, 14, 29, 49-50, 52, 57
    And League of Nations, 33
    Defense, 283
    Purpose, 284
    Senate Committee Report, 31
  Secretary, Position on Mexican Revolt, 40
Kelly, John B., 558
Kenosha, Wis., City Planning, 125
Kent, Frank, 13
  Fred I., 346
Kentucky Amendment, 92
  Council-Manager Plan, 104
  Impeachment, 97
Ketchum, Milo P., 583
Kettleborough, Charles, 93
Kindred, James E., 695
King George, Naval Conference, 285
  of Italy, Visit to Vatican, 46
Kirchwey, Dr. George W., 495
Kirkpatrick, Sidney D., 684
Kish, Neolithic Research, 759
Klein, Arthur J., 832
Kline, Charles M., 22
Knight, Howard R., 502
Korbel, Mario, 807
Kramer, Roland L., 304

LABOR Acts, 521
    Railroad, 534
    And Socialist International, 499
  Arbitration, 521
  Board of Mediation, Adjustments, 534
  Building Trades, 520
  Child, 525, 526
    Bibliography on, 526
    Indian Conditions, 525
    Legislation by States, 525
  Conditions of, 519
  Credit Unions, 524
  Department of, 74
  Displacement by Machinery, 522
  Functions, Changes in, 598
  Garment Industry, 521
  Industrial Arbitration, 535
  In Politics, 527, 528
  Legislation, 519, 529-532
    Administration, 532
    Amendments, 529
    For Children, 531
    Hours, 530
    In Coal Mines, 531
    Yellow-dog Contracts, 531
  Lock-outs, 534
  Mediation, 534
    Railroad, 534
Labor Movement, Problems of, 521
  Organizations, 519-524
  Party, Legislation, 527
    Polling Strength, 527
    Proposed Bills, 528
    Socialist, 527
    Textile Disputes, North Carolina, 528
  Laws, Pensions, 529
  Pensions, Old-age, 523
  Railway, 520
  Railway, Research Foundation, 524
  (See Business)
  Strikes, 521, 534, 536, 537
  Textile Trades, 522
  Trade Union, 528
  Union, 519
    Organization, 520
    Printing, 535
  Visas, 474
  Wages, 519
  Workmen's Compensation, 529
  Yellow-dog Contracts, 520
La Follette, Robert M., 527
La Guardia, Fiorello, 22
Lake Cargo Cases, 87
    States, Fisheries, 397-398
  Survey, 197
Lambeth Council, 552
Land and Property Taxes, 181-185
  Office, General, 209
  Titles and Restrictions, 212-214
Lands, Public, 208-212
Language, Celtic, 791
  Classical, 791
  English, 775-779
  German, 780, 781
  Germanic, 791
  Hittite, 792
  Lithuanian, 792
  Romance, 781-783, 791
  Semitic, 788-790
Larinte, 654
Latin America, Changes in Tariff, 318
    Economic Relationship, 661
    (See Foreign Trade)
    Relations, 36-40
  English Studies, 784
  Medieval, 784
Laughlin, Harry H., 469
Law, Multiple Dwelling, 109
Laws, Changes in Electoral, 93-95
  Personnel, 78
Lead, 418, 419
  Alloys, 418
  Arsenate, 680
  Future of, 402
  Harris Process, 418
  Industry, 418
  Prices, 419
  Production, 419
  White, 683
League of Nations, 56, 499
    Amendment, 33
    American Representation in, 48-49
    American Membership, 51
    America's Acceptance of, 48

League of Nations, America's Relations to, 48-54
And Hoover Administration, 49
Assembly, 49
Briand's Part in, 33
Central Agencies, 49
Continuing Committee, 54
Contributions to, 54
Council, 49
Covenant, 50
Economic Committee, 53
Perparatory Commissions (See Naval Limitations)
Senate and Conventions, 50
Slave Trade, 50
Treaty Series, 53
Lee, Algernon, 498
Leet, L. Don, 647
Legislation, Agricultural, 376-378
Federal, 6-9
Merit System, 82-83
Naval, 7
On Pensions, 268
State Income Taxes, 186
Tax, 178-180
Legislative Bodies, Municipal Statistics, 115
Legislature and Legislation, State, 95-96
Leighton, M. M., 199
Leonard, Harold J., 730
Lewis, Sinclair, 770
Library, Appropriations for, 793
Awards, Newbery Medal, 794
Bibliography, 795
Buildings, 797
Congress, 796
Courses, 793
Funds, 796
International Cooperation, 796
Legislation, 793, 796
Schools, 794
Textbooks, 794
Service, 792
Libraries, 792-797
Circulation of, 792
County, 792
Municipal Reference, 117
Life, Greek, 788
Insurance, 348-352
Aviation, 350
Benefits of Accidental Death, 350
Disability Benefits, 349
Dividends, 348
Premium Rates, 349
Statistics of Companies, 350, 351
Statistics of Increase, 348, 349
Saving, International Conference, 617
Lighthouses, Bureau of, 451
Lighting, Electric, 233
Lightning, Protection Against, 602-603
Study of, 602
Lilley, Ernest R., 406
Lincoln, President (See Aviation)
Lindbergh's Flight (See Aviation)
Linguistic Conference, 790
Indo-European, 790
—Iranian, 791
Publications, 791
Literary Discussion, 776
Literature, 764
Approach to, 776
Biographies of, 768
Criticism of, 774
Eighteenth Century, 779
English, 775-779
French, Medieval, 781
German, 780, 781
Modern Period, 780
Older Period, 780
Greek, 785-788
Historical, 777
Italian, 783
Latin, 783-785
Middle English
Bibliographical Discussion, 776
Old English, 776
Provençal, 782
Related to Modern Civilizations, 785
Romance, 781
Nineteenth Century, 782
Sevteenth Century, 782
Romantic, 777
Roumanian, 783
Semitic, 788-790
Spanish, 782
Survey of, 775
Lithium, 682-683
Livestock, 371-372, 391
And Meats, 383-385
Disease and Pest Studies of, 388
Equipment of, 207
Financial Returns, 371
Health, 387
Maladies and Treatment, 387, 388
Retrenchment, 383
Tuberculosis of, 388
Load Building, 607-608
Lobby, The, 95
Locke, Charles E., 401
Locomotives, 597
Internal Combustion, 597-598
Loeb Classical Library, 785
Logic, 742
London Naval Conference, 9, 48
Longworth, Nicholas, 2
Loomis, Frederic B., 702
Lord, General, 162, 163
Los Angeles, Regional Planning, 121
Loseyite, 654
Louisiana, Impeachment, 96-97
Literature on, 782
Loveman, Amy, 769
Lubricating Systems, 594
Lumber Consumption, 394
Cut,
Analysis of, 394-395
Industry, 394-395
Production, 394
Lungs, 720
Lutheran Communion (See Religion)
Lybyer, Albert H., 40, 45
MACALLEN Case, 186, 188, 190-192
MacCormick, Austin H., 491
Machine Design, Factors in, 594
Shop Practice, 593-594
Machinery, American, 642, 643
Export Trade, 643
Prosperity, 642
Replacement of Men by, 598-599
Statistics, 642
Trade Associations, 644
Utility, 643
MacMahan, Arthur W., 1, 6
MacMillan, Donald B., 665
MacDonald, Ramsay, 48, 499
On Kellogg Pact, 31, 32
Visit to America, 12, 36, 285
Thomas H., 439
Madagascar, Rubber Plants, 668
Magnetic Field Work, 658
Observatories, 658
Surveys, 658
Maine, Amendments, 92
Excise Tax, 194
Exportation of Electric Energy, 608
Referenda, 92
Malcolm, Roy, 148
Man, Early, 758, 759
Manchurian Problems, 56
Manganese, Tariff on, 402
Manifolding, 611
Manning, Bishop, Church Discipline, 552
Marine Corps, 281
Engineering, 614-618
Commercial, 618-622
Insurance, 353-355
Fire and Casualty Companies, 354, 355
Losses in Ocean Business, 354
Underwriters Board, 355
Volume, 354
Merchant, 449
Maritime Jurisdiction, 146-147
Marketing, 390-392
Conditions, 370-371
Effect of Stock Market on, 391
Problems, 391
Marriages, Statistics, 485
Marsh, Arthur Richmond, 321
Marshall Field Housing Project, 505
Marvin, Thomas O., 426
Maryland, Child Labor, 525
Voting Requirements, 93
Massachusetts, Child Labor, 525
Corporation Taxes, 189
Corrupt Practices Act, 94
Excise Tax, 194
Lobby, The, 95
Nominations, 94
Materials Bureau, 279
Mathematical Research, 570-571
Construction (See Engineering)
Mathematics, 570-575
Application to Social Sciences, 571-572

Mathematics, Bequest, 571
  Bibliography of, 573
  Book of the National Council, 574
  Engineering, 572
  Foreign Visitors, 574-575
  Gibbs Lecture, 571
  History of, 572-573
  Meetings, 574
  Source Book in, 572-573
  Teaching of; in Secondary Schools, 573-574
Mather, Kirtley F., 646, 647
Mathews, J. M., 31, 90, 95-97
Mathias, Mildred E., 705
Manufactured Goods, Exports, 420
    Imports, 420
Manufactures, Construction Material, 422
  Distribution, 420
  Statistics of, 421, 463-467
  Transportation, 420
Manufacturing, Automobile Growth, 422
  Biennial Census, 463
  Classification, 464, 465
  Conditions in, 420-423
  Constructions, 420
  Expansion of, 423
  Industries
    Employment in, 420, 433
    Statistics of, 466, 467
  Output, 421
  Production, 422, 464
  Standards, 631
  Textile Situation, 631
May Beetles, 389
McColloch, F. W., 716
McFadden Publications, 88
McKay, A. W., 390
McLaren, Walter W., 54
McNary, Senator, 2
Mead, Bennet, 488
Meat Packers, 86
  Products, Imports in, 385
Meats, Livestock and, 383-385
Mechanical Engineering (See Engineering)
Medical Department, Army, 254
  School
    Army, 263
    Field Service, 263
  Sciences, 717
Medicine, 722-726
  Bibliography of, 725-726
Mediterranean Fruit Fly (See Insect Pests), 7, 388, 389, 392, 713
  Act, 377
Mellon, Andrew W., 1
  Beranger Debt-funding Agreement, 167
  Relation to Cabinet, 14
Memory, 750
Mennonites, 562
Mental Growth, Tests of, 763
  Hygiene, 510-512
    Colleges, 512
    Personnel in, 511
    Research and Study in, 512
  Measurements, 760-763
  Tests, 760-763
    And Measurements, 760-763
Mental Tests, Multiple Factor Theory, 761
  Two-factor Theory, 760-761
Menzel-Gerasimovic Award, 581-582
Merchant Marine, 449-453, 615
Merrill, Dr. Paul W., 581
Mesopotamia, Archaeological Discoveries in, 800
Metal Situation, Outlook, 401
  Prices
    Changes in, 401
Metallo-Organic Compounds, 675
Metals in Foods, 678
  Used in Engineering, 623
Metaphysics, 740
Metaplasia, 722
Metazoa, 700
Meteorology, 655-658
  American Geographical Union, 656
  Optical, 657
  Service, 249
Metering, 606
Methane, Behavior of, 673-674
Methodist Communion (See Religion)
  Episcopal
    General Conferences, 544
Methodists, Union of (See Religion)
Metric Spark Plug, 613
Metropolitan Museum, Discoveries for, 799
  And Regional Planning, 119-121
Mexican Bean Beetle, 390, 715
Mexico, Church Difficulties, 560
  State, 551
  Collapse of Revolt, 40
  Conventions with, 31
  Gold Output, 415
  Immigration Laws, 470
  National Library, 796
  Neolithic Research, 759
  Nonquota Immigrants, 477
  Presidential Election, 40
  Revolt, 40
    Result of, 40
Michigan Bell Telephone Co., 608
  General Elections, 94, 95
  Municipal Home Rule, 108
  Registration, 93
  Securities Legislation, 324
  University of Aerological Observatory, 667
    Music Festivals, 816
Midwestern Psychological Association, 748
Migratory Bird Act, 377
    Conservation, 8
Military Education, 258-266
  Naval Pensions, 267, 268
  Problems of the United States, 238-242
  Training Camps
    Citizens, 259
Militia Bureau, 240, 254
Milk and Butter, 385-386
  Tariff on, 427
  Vitamins, 733-734
Miller, A. James, 721
  Jr., John A., 445
Milton, 778
Minerals, 210
  Industries, 401
    Importance, 651
  Leasing Act, 210
  Nutrients, 705
  Resources, 201
Mineralogical Society Meeting, 653
Mineralogy, 653, 654
Mines, Bureau of, 457
Mining Industry, Reaction, 401
  Operations, 402, 413
  Ore Dressing, 401-404
  Production
    Prospect for Future, 401
  Technique, 402
Ministers, Foreign, 28
Minnesota, General Elections, 94
  Pension Law, 540
Minor Planets, 577-576
Mission Work, Foreign, 547
Mississippi, Earthquakes, 648
  Flood Control, 238, 273, 638-641
      Responsibility of Federal Government, 639
    Damage, 640
    Lives Lost, 640
  Hydraulic Laboratory, 641
  Levees, 640
  -Ohio System, 230
  River Commission, 196, 638
Missouri, Child Labor, 525
  Securities Act, 324
  Tax Commission, 182
Mitchell, Attorney-General (See Prohibition), 17
Mitscherlichite, 654
Moffett, W. A., 288
Mohler, John R., 387
Molds as Manufacturing Agents, 678
Molecular Spectra, 673
  Structure, 673
Moncada, President, 36
  Election of, 38
Monchow, Helen C., 212
Money Rates (See Stock Market)
Mongolia, Expedition to, 668
Monoplane (See Aviation)
Monroe Doctrine (See League of Nations), 33, 148
Montana, Bank Taxation, 191
  Compensation Law, 539
  Education in, 834
  Silver Output, 414
Moore, C. C., 208
Mooreite, 654
Morgan, Arthur E., 638
  J. P., 48
Morphogenesis, 697
Morphology, 695, 700
  Development, 700
Morrow, Dwight W., 12
    Reconciliation with Mexico, 14
Mortality Rates, Infant, 736
  Statistics, Federal, 735
Moses, Senator, 2
Motion Pictures, 86, 821-825
Motor Bus, Acquisition by Railroads, 443

- Motor Bus Company
    - Mergers
        - Results, 443, 444
    - Holland Tunnel, 443
    - Municipal Control, 445
    - Routes, 443
    - Service, 442-445
    - Taxes, 193-194
    - Transportation
        - Growth, 444
  - Roads, 439
    - Construction, 440
    - Expenditures, 441
    - Federal-Aid System, 439
    - Improvements, 440
    - Maintenance, 440
    - Types, 440
    - Usage, 441
- Mules, 384-385
- Multiple Dwellings Law, 504-505
- Municipal Center, Appropriation for, 8
  - Expenditures, 175-176
    - Statistics, 176
  - Functions, 109-119
  - Government, Types of, 104-106
  - Legislative Bodies, Statistics, 115
  - Music, 116
  - Ownership, 221-225
  - Reference Libraries, 117
  - Research Bureaus, 178
  - Revenue, 177
    - Receipts
        - Statistics, 177
- Municipalities
  - State Leagues and Secretaries, 118-119
- Murdock, Carleton C., 688
- Murphy, T. F., 735
- Music, 811-817
  - Festivals, 816
  - Municipal, 116-117
  - The Opera, 811-817
- Mussolini, Accord of 1929, 45
  - Attitude Toward Church, 45
  - Treaty with Church,
    - Political Provisions of, 45
    - Views in Accord of 1929, 46
- Muscle, Smooth, 719
- Mycology, Contributions in, 707
- Myers, Denys P., 29

- NATIONAL and Interstate Relations of States, 90
  - Budget, The, 158-164
  - Child Labor Committee, 512
  - Commission on Law Observance and Enforcement, 15
    490
  - Committee on Mental Hygiene, 510, 512
  - Conference of Social Work, 502
  - Defense
    - (See Aviation), 281
  - Electric Light Association, 218
  - Expenditures and Revenues, 151-158
- National and Interstate Relations of States, Statistics, 152-154
  - Finance
    - Army Building Program, 156-157
    - Flood Control Estimates, 156
    - Foreign Service Housing, 157
    - Hospital Facilities, 157
    - Navy Building Program, 156-157
    - Total Building Estimates, 157
  - Forests, 395
  - Government, 59
  - Hydraulic Laboratory, in Mississippi, 641
  - Interracial Conference, 758
  - Marketing Agency, 391
  - Origins, Determination of, 471
  - Receipts, Statistics, 154
  - Research Council, 856
  - Standardization, 633
  - Statesmen, 13, 14
- Natural History, Field Museum, 666
- Naturalization, 89
  - Application for, 480-481
  - Bureau of, 480
  - Fees, 482
  - "First Papers," 481
  - Judicial Action on, 481
  - Judicial Jurisdiction of, 480
  - Limitations of, 479-480
  - Machinery of, 479-480
  - Petitions and Grants, 482
  - Procedure, 480-482
  - Residential Requirements of, 481-482
  - "Second Papers," 481
  - Women, 482-483
  - World War Veterans, 483
- Naturalized Persons, Statistics, 482
- Naval Aeronautics, 288-290
  - Architecture, 614-618
  - Armaments, Limitation of, 47
  - Conference, 7
    - Coolidge, 48
    - London, 48, 285
  - Construction, 285-288
  - Disarmament Treaty, 285
  - Education, 290-292
  - Equipment, 285-288
  - Legislation, 7
  - Limitation Conference, 9
    - Preparatory Commission, 12
  - Officers, Education of, 291
  - Reserve Officers Training Corps, 291
  - Shore Construction Bill, 288
  - Stations, Maintenance, 280
  - War College, 292
- Navigation, 617
- Navy, Administration (See Army), 282
  - Appropriations, 280
  - Building Program, 156
  - Coast Defense, 284
  - Cruiser Construction, 285
    - Appropriation, 288
  - Department of, 74-75
- Navy, Duty, 284
  - Expenditures, 157
  - Factor in Trade, 282
  - Functions, 282-284
    - In Peace, 284
    - In War, 284
    - Open Door Policy, 283
  - Organization of, 278
  - Size, 284
  - Standardized Purchasing, 632
- *N* Dimensions in Economics, 571-572
- Near East, Relations with America, 40
- Nebraska, Bank Taxation, 191
  - Nominations, 94
  - Tax Commissioner, 182
- Necrology, 582
- Negroes, Education, 514
  - Migration to New York, 546
- Neolithic Research, 759
- Neoplasms, Etiology of, 721-722
- "Nerve," An Artificial, 718
- Nervous System, 695-699
    - Sympathetic, 717-718
  - Organization, 717-718
- Net Governmental Cost Payments of Cities, Statistics, 176
- Neujmin & Forbes Comet, 578
- Nevada, General Elections, 95
  - Gold Yield, 414
- Nevins, I. D., 423
- Newbery Medal, 794
- Newcomer, Mabel, 185
- New England, Earthquakes, 648
  - Vessel Fisheries of, 396-397
- New Hampshire, Amendment, 92
  - Exportation of Electric Energy, 608
  - General Elections, 95
- New Jersey, Administrative Reorganization, 97
  - County Fiscal Reform, 102
  - County Government, 101
  - Elections, 21
  - General Elections, 94
  - Securities Act, 324
  - Submetering, 608
  - Zoning, 123-124
- New Mexico, Archaeological Discoveries in, 799
  - Employment Laws, 539
  - Mining Facilities, 414
- New Orleans, City Planning, 125
- New York, Amendments, 92
  - Barge Canal, 228
  - Buildings, New, 809-810
  - Central, 87
  - City, Amalgamated Housing Development, 505
    - Coale Murals, 802-803
    - East Side Reconstruction, 506
    - Government of, 103
    - National Committee for Mental Hygiene, 512
    - Regional Plan, 120
  - Committee on Regional Planning, 119-120
  - Corporation Tax Law, 189
  - Criminal Procedure, 98

New York, Department of Hospitals, 107
  Earthquakes, 647
  Employment, 540
  Importance as Port, 274
  Mayoralty Election, 496
  Municipal Home Rule, 109
  Party Committees, 94
  Police Instruction, 114
  Port of, 230
  Prohibition Statistics (See Prohibition)
  Protest, Arab Uprising, 565
  Public Service, 215
  Regional Plan, 664
  Sculptural Exhibits, 808
  Sewage Disposal, 107-108
  State
   City Planning, 125
  Term Question, 96
  Veto, The, 96
  Voting Requirements, 93
  Zoning, 123
Niagara Frontier Planning Board, 120
  -Hudson Power Corporation, 218
Nicaragua, American Marines in, 36
  Augustino Sandino, 149
  Canal Project, 39
  Canal Survey, 149
  Inter-American Highway, 149
  Monroe Doctrine, 148
  President Hoover's Visit, 148
  U. S. Marines, 148
Nickel Electrolyte, 683
  Surface Reaction, 672
Nitrate, World Supply, 315
Nitriding, 624
  of Steel, 682
Nitrogen, Ammonia Conversion of, 681
  Commercial Production of, 681
  Fixation, 681
Nitrogenous Fertilizers, Imports of, 687
Noble, G. Kingsley, 692
Norris Resolution, 2
  Senator, 2
North American Fungi, 707
North Carolina, Board of Assessments, 182
  Communists, 528
  Compensation Law, 538
  Corporation Taxes, 189
  County Fiscal Reform, 102
  Reorganization of County Government, 99-100
  Workman's Compensation Act, 513, 529
North Dakota, Corporation Taxes, 189
Northwestern University, Expeditions, 667
Notz, William F., 313
Novelists, Nineteenth Century, 779
Novels, Detective, 772
  First, 773
  Of Morals, 772
  Of South, 771
  Problem, 772
  Social Transition, 772
Novels, War, 771
Nutrition, Human and Animal, 679
Nye, Senator, 2

OATS, 371, 381
  Oceania (See Foreign Trade)
Ochs, Adolph S., v
O'Fallon Case (See Railroads)
Office Sale Investigation, 80
Officers, Reserve, Training Corps, 258
Offset Milling, 594
Ohio, Administrative Organization, 97
  Amendment, 92
  Municipal Home Rule, 108
  Philosophical Activity in, 747
  Reapportionment, 95
  Securities Law, 324
Ohio River, Lock System, 277
  Navigation, 278
   Development, 277, 278
  Trade Routes, 229
Oil, 201, 679
  Conservation, 209
  Cut in Production, 402
  Fuel, 407
  Geology, 652
  Industry, Gains, 408, 409
  Leases, Assessment of, 184
  Products, Demand for, 406
  Reserve in, 402
  Situation, 88
Oklahoma, Child Labor Committee, 525
  Impeachment, 96-97
Olmstead, H. M., 121, 217, 221
O'Neill, Eugene, 820
Onions, Tariff on, 427
Open Door (See Navy)
Opera, The, 811-817
Opium Advisory Committee, 53
Opportunity School (See Education)
Orbit Computation, 577-578
Orchestras, 813-816
Ordnance Schools, 264
Ore Deposits, 202
  Supply of, 402
  Dressing,
   Smelting, 403
Oregon,
  Administrative Reorganization, 98
  Bank Taxation, 191
  Corporation Taxes, 189
  Great Basin, 647
  Law (See Education)
  Securities Law, 324, 325
  Tax Commission, 182
Organic Chemicals, Production of, 678
  Chemistry, 673-677
  Compounds, Optically Active, 676
  Evolution, 692-695
  Symposium, 677
Organization of the Army, 242-246
  Navy, 278-282
Organizations, Religions, 542
Organized Social Work, 502-504
Orient, Autonomous Tariff, 318
  Relations with America, 40
Oriental Churches, Orthodox, Affairs of, 561, 562
   Patriarch of Constantinople, 561
  Fruit Moth, 389
Orphanages and Schools, 514
Overseas Securities Company, 326
Ownership, Municipal, 221-225
Oxidation, 674
Oxides, Halogen, 671

PACIFIC Coast, Earthquakes, 649
   States, Fisheries, 397
  Crane Expedition, 667
  Cruise, Carnegie, Magnetic Surveys, 658
  Relations, Institute of, 56-57
  Scientific Congress, 677
Packaged Fresh and Frozen Fish, 396
Pact, Kellogg (See Kellogg Pact)
Painting, 802-805
  Competitions, 804
  Exhibitions, 803-804
  Fellowship, 804
  Mural, 802-803
  Prize Awards, 803-804
Paleography, 785
Paleontological Discovery, 692
  Publications, 704
  Vertebrate, 702-705
Palestine, 504
  Arab Uprising, 550
  Archaeological Discoveries in, 800
   Studies, 788
  Conditions in, 43
  Conflicting faiths, 550
  Controversy between Jews and Arabs, 44
  European Relief, 566
  Jewish-Arabian Clash, 565
Panama Canal, Commerce, Statistics, 276
   Relations, 39, 150
   Trade Route, 229
Pan-American Conference, 320
  Immigration Policy, 470-471
Papacy (See Catholic Church)
Papyri, 786
Pardoning Power, State, 97-99
Parent-Teacher Agencies, Mental Hygiene, 512
   Sex Education, 512
Parker, Francis Le Jan, 127, 131, 138
Parrish, Anne, 772
Pathology, 721-722
  References, 722
Peanuts, Tariff on, 428
Pecos, Archaeological Discoveries in, 799
Penal Institution, 8
Pennsylvania, Council-Manager Plan, 105
  Elections, 21
  Fiscal Code of, 182
  University of
   Gifts for Research, 857

- Pennsylvania, Voting Requirements, 93
- Pension Bureau, 267
  - Civil Service Fund, 268
  - Claims, 268
  - For Aviators (See Aviation), 268
  - Laws, in States, 540
  - Military and Naval, 267
  - (See Labor)
- Perception, 749-750
- Periodical Cicada, 390
- Persia, Progressive Policy, 44
- Personality Tests, 761-762
  - Affection, 750-751
  - Children, Sociability in, 762
- Peru, Accepts Settlement on Tacna-Arica Dispute, 38
- Pests, Insects (See Insect Pests)
- Petrography, 653, 656
- Petroleum, 201, 406-409
  - Geology, 652
  - Hydrogenation, 685
  - Increased Production, 402
- Pharmacology, 726-728
  - Loevenhart, 728
- Phenol Resinoids, 686
- Philippine Islands, The, 138-141, 480
  - Affairs of
    - Supervision of, 256
  - Earthquakes, 649
  - Economic Development, 140-141
  - Education, 141
  - Finances, 140
  - General Conditions, 138
  - Government of, 138-139
  - Health, 141
  - Legislation, 139
  - Protestant Unity, 548
  - Volcano in, 647
- Philadelphia, City Planning, 125
  - Orchestra, 814
  - Police Instruction, 114
  - Quartermasters' Schools, 265
  - Regional Planning Federation, 120
- Philharmonic Orchestra, 814
- Philosophical Activity in Ohio, 747
  - And Social Sciences, 740
  - Association, American, 746
  - Biography, 743
  - Popular Magazine, 743
  - Union of the University of California, 747
- Philosophy, 740-747
  - And Psychology, Southern Society for, 748
  - Creed, 787
  - History of, 742-743
  - Jewish, 746
  - Literary, 746
  - New Publications in, 742
  - Political, 745-746
  - Prince, Dr. Morton, 747
  - Religious, 744
  - Selections, 743
  - Symposia of, 745
  - Textbooks, 742
  - Wenley, Prof. R. M., 747
- Phosphoric Acid Method, New, 682
- Photo Activation, 672
- Photoelectric Cells, 606, 684
- Physical and Inorganic Chemistry, 670-673
- Physics, 688-690
  - Bonhoeffer, 690
  - Condon, 690
  - Gamon, 690
  - Geiger-Nuttal Relation, 690
  - Gurney, 690
  - Kulenkampff, 690
  - Michelson-Morley Experiment, 689
  - Millikan, 689
  - Sommerfield, 690
- Physiologic Studies, Economic Plants, 711
- Physiological Psychology, 751
- Physiology, 699, 701, 717-722
  - Lillie, 718
  - Mineral Nutrients, 705
  - Plant, 705
  - Vibrations, High-Frequency, 720
- Pig Iron Production, 296
- Pigs, Decrease in Raising, 384
- Pi Mu Epsilon Mathematical Fraternity, 575
- Pipe, 597
- Pittman Act, 211
  - Key, 2
- Pittsburgh, Carnegie Institute, 803
  - Plan, Federated, 101-102
- Pituitary Principle, 726
- Planetaria, 575-576
- Plant, Cytology, 708
  - Geography, 708
  - Life
    - Local Flora, 709
  - Morophology
    - Studies in, 706
  - Physiology, 705
    - Light, 705
  - Quarantine, 713
  - Reproduction, 707
  - Rusts, 707
  - Studies in Anatomy, 706
  - Taxonomy, 706
- Plants, Economic, Physiologic Studies, 711
  - As Pharmacological Reagents, 720-721
  - Effect of Light, 710
  - Tropical, 712
- Plastic Resinoids, 686
- Playwrights, 819-820
- Plum Curiculo, 389-390
- Pneumococci, Type IV, 722-723
- Pneumonia, 722-724
  - Oxygen Treatment of, 723-724
  - Serum, Treatment of, 723
- Poetry, 777
- Poets, Nineteenth Century, 779
- Poland, Socialism, 501
  - Treaty with, 31
- Polar Expeditions, 665
- Police Activities, New, 497
  - Governmental, 106-107
  - Personnel, 78
  - Training School, Cities, 115
  - Women,
    - Statistics, 113-114
- Policies, Economic, 10
  - President's, 9-13
- Political Philosophy, 745-746
  - City, 103-104
  - Institute of, 54
  - Labor in, 527, 528
- Polygenic Functions, 571
- Polymerization, 674-675
- Pope Pius IX, State and Church, 45
- Population, XI, 561
  - Classifications, 485
  - Declining Rate of Increase, 484-485
  - Forum, 485
  - Future Growth of, 484-485
  - Growth of Continental United States, 483
  - Problems, 757
  - Rates of Increase, 484
  - Registration Area, 483-484
  - Sex, Age and Race, 485
  - Statistics, 483-486
  - United States Statistics, 484
  - Urban and Rural, 485
- Port Developments, 231
  - New York Authority, 274
- Porter Resolution, 32
- Porto Rico, 131-134
  - Economic Conditions, 132-133
  - Education, 133-134
  - Exports, 132
  - External Trade
    - Statistics, 132
  - Finances, 133
  - Health, 134
  - Hurricane, 131-132
  - Public Works, 133
  - Relief, 377
- Ports, Pacific, 274
  - South Atlantic, 274
- Portland, Me., Council-Manager Plan, 105
- Postmasters, 79
- Post Office Department, 73
    - Topography Branch, 197
  - Treasury Bill, 160
- Potash Act, 318
- Potato, Deterioration, 711
- Poultry, 372, 384
- Power Developments, 684
  - Electric, 233
  - Generation, 595
  - Systems, Designs and Methods of, 601
- Pragmatic Antiphonal, 740-741
  - Attack, 741
- Pratt, George K., 510
- Presbyterian Church (See Religion)
  - General Assemblies, 544
  - Union of (See Religion)
- President and His Policies, (See Hoover)
- Preventive Work in Delinquency, 495-498
- Primaries, State, 95
- Princeton-Buffalo Expedition, 667
  - Theological Seminary, 557
- Prison Conditions, 489-491
  - Construction, New, 492
  - Housing, 492-493
  - Labor, Expansion in, 493
  - Local, 494
  - Mental Work in, 511

- Prison, Penal Conditions, 491-495
  - Personnel, 495
  - Program, Federal, 494-495
  - Publications, 495
  - Riots, 491-492, 497
  - Unemployment, 493
- Problems of the United States, Military, 238
- Production, Control of, 313
- Prohibition, 87, 90
  - Administration, 15
  - Appropriations, 20
  - Budget, The, 160
  - Concurrent Jurisdiction, 90
  - Controversy, 15-21
  - Customs Bureau Analysis, 18
  - Deaths from, 19, 20
  - Delinquency, 497
  - District of Columbia, 19
  - Doran's Report, 17, 18
  - Enforcement, 17
  - Exported from Canada, 18
  - Federal Authority, 90
    - Civil Service, 79
    - Plans for, 15
  - Governors' Conference, 16
  - Jones Act, 8
  - Legislation on, 20
  - Liquor Smuggling, 19
    - Conventions, 146
  - Mitchell's Attitude, 17
  - National Commission on Law Observance, 15
  - Senator Borah's Attitude, 16, 17
  - State Authority, 90
  - Statements by Hoover, 16
    - Wickersham, 16
  - Statistics, 17, 18
  - Wickersham to Governors, 16
  - Willebrandt's Report, 18
- Property Tax Exemptions, 183-184
  - General, 181
  - Land, 181-185
- Proteins, 679
- Protestant Denominational Activities, 551-558
  - Episcopal General Convention, 544
  - Unity (See Religion)
- Protocols, 50, 51
  - Acceptance of, 51
- Protozoa, Life Cycle, 699
- Psychiatric Work, 510-511
- Psychological Association, Midwestern, 748
- Psychology, 747-753
  - Attention, 750-751
  - Audition, 749
  - Congress, 859
  - Current Publications on, 752
  - Experimental Problems in, 748
  - Foundations of Experimental, 752
  - General Literature in, 753
  - Histories of, 752-753
  - Indexes, 752
  - International Congress of, 747-748
  - Physiological, 751
  - Reviews, 752
  - Sensory, 748-749
- Psychology, Southern Society for Philosophy and, 748
  - Texts, 753
- Psychopathology, 751-752
- Psychophysics, 748-749
- Public Control of Futures Trading, 321-323
  - Debt
    - Interest Rate, 164
    - Payments, 164
    - Present Status of, 166
    - Reduction of, 164
    - Retirements, 164-165
    - United States, 164-170
  - Finance and Taxation, 151
  - Health, 732-735
    - Service, 8
  - Hygiene, 732-735
  - Lands, 208-212
    - Area of, Statistics, 212
  - Aviation Purposes (See Aviation)
    - Disposition of, 209
    - Policy, 209
    - Receipts from
      - Statistics, 209
  - Resources and Utilities, 196
  - Roads,
    - Bureau of, 458
  - Service Commissions, 214-217
  - Schools (See Education)
  - Utility Mergers, 217-220
    - Regulation, 608
- Pulitzer Prize Play, 818
- Pyrethrum, 680

- QUARTERMASTER Schools, 265
- Quick-Freezing Process, The Birdseye, 678
- Quota System, The, 475-479

- RACE Conditions in the United States, 469-472
  - Classification, 471
  - Distribution, Data on, 471
- Racial Integrity Laws, 471-472
- Radcliffe, Lewis, 369
- Radio, 89, 459-463
  - Act, 8, 89
  - Aeronautic, 463
  - As Advertising Medium, 462
  - Broadcasting, 462
  - Civic Use of, 116
  - Industries, 631
  - Industry, 460
  - In Education, 860
  - Influence on Music, 811-812
  - Lighthouse Beacons, 463
  - Service, 248
  - Statistics of Sales, 461
  - Study in, 853
  - Telegraphy, 462, 617
  - Telephony, 462
  - Television, 459
  - Transmission, Investigations, 659
  - Transoceanic Communictions, 462
- Radiobeacons (See Aviation)
  - Use in Byrd Expedition, 459
- Railroads, 86, 434-439
  - Bus Operation, 444
  - Capital Investment, 308
- Railroads, Development of, 434
  - Employment, 310, 436
  - Engineering, 597-598
  - Equipment, 309
  - Expenses, 437
  - Finances, 435
  - Freight Rates, 438
  - Fuel for, 437
  - Maintenance Expenditures, 438
  - Makes for Industrial Improvement, 436
  - Mileage, 308
  - O'Fallon Case, 434
  - Passenger Traffic, 312
  - Payments
    - Statistics of, 313
  - Revenue, 310, 437
    - Shares (See Stock Market)
  - Traffic and Earnings, 308-313
    - Development, 313
    - Freight, 311
    - Transportation Service, 436
  - Wages, 310
- Railways, Electric, Future of, 444, 445-449, 447
  - Grade Problems, 226
  - Statistics, 448
- Rain Precipitation, Forecast of, 607
- Rapid Transit Commission, 221
- Raritan Arsenal, 264
- Rastall, W. H., 643
- Raynaud's Disease, 729-730
- Rayon, 687
  - Brandwood Process, 687
  - Developments, 687
  - Lilienfeld Process, 687
  - Production, 687
  - Trends in, 687
  - Weighting of, 687
- Reactions at Surfaces, 672-673
- Reactors, 605
- Reading, Government of, 104
- Reciprocity Legislation, 192-193
- Reclamation and Irrigation, 203-208
  - Policy, 204
- Referenda, State, 92-93
- Reformatories for Men, 493-494
  - Women, 494
- Reformed Church (See Religion)
- Refrigeration, 595
- Reid, A. Duncan, 355
- Reidling, Edward, 22
- Religion, 542
  - Baptist, Union, 555
  - Christianity in Africa, 549
  - Congregational Christian Communion, 554
  - General Conference, Methodist Church, 557
  - Greek, 787
  - In Japan, 549
  - Negro Church, 546
  - Pentecostal Anniversary of Church of Christ, 546
  - Presbyterian Churches, Union of, In Scotland, 542
  - Proposed Union of Churches, 544

- Religion, Protestant Unity, Philippines, 548
  - Reformed Church, Action of, 544
    - In America, 558
  - Revised Prayer Book, 552
  - Second World Convention
    - Lutheran, 556
  - Union of Congregational with Christian Churches, 543
    - Presbyterian and Reform Bodies, 558
  - World Conferences of Churches, 561
- Religious Conventions, 553, 554
  - Cooperation in Sex Education, 508
  - Organizations, 542
  - Philosophy, 744
- Renaissance, 782
- Renardite, 653
- Resins, Expansion, 686
- Revenue from Federal Income Tax Statistics, 186
  - National, 151-158
- Rheumatic Fever, 725
- Rhode Island, Corporation Taxes, 189
  - Voting Requirements, 93
- Rice, 382
  - Calvin W., 590
- Richard, Bernard G., 562
- Rinehart, Mary Roberts, 772
- River and Harbor Act, 228
- Roback, A. A., 740
- Robinson, Leland Rex, 326
  - Senator, 2
- Rodgers, William Ledyard, 282, 278
- Rogers Act, 24, 26
- Rolfe, John C., 783
- Roman Catholic Church, 558-561
    - Status with Mussolini, 46
    - Schools, 558
  - Question, 45
  - Writers, 785
- Romantic Fiction, 770
- Romanticism, German, 780
- Rome, Library Congress, 796
- Root, Elihu, 14
  - Formula, 13, 34, 47, 51
- Roosevelt, Franklin D., 15
  - Governor, 96, 497
    - Government Reform, 101
- Rosenwald Housing Fund, 505
  - Julius, 514
- Rossell, Beatrice Sawyer, 792
- "Rotating Bus," 601
- Rotenone, 680
- Rousseau, Jean Jacques, 782
- Routes, Inland Barge, 229
- Royal Baking Powder Company, 88
- Rubber, Restriction Scheme, 316
- Rural Government, County and, 99-102
- Russia, Condition of Jewry, 566
  - Conflict between Churches and Soviet, 561
  - Primitive Man, 759
  - Settlement with China, 41
- Rye, 381

- SAFETY of Life at Sea, International Conference on, 48, 146
- Sails, 679-680
- St. Louis, City Planning, 125
  - -O'Fallon Case, 86-87
- Salmon Memorial Lectures, 510
- Salvation Army, 558
  - In Japan, 550
- San Francisco, City Planning, 125
  - Exhibition, 806
- Satin Moth, 714
- Scandinavian Currencies, 347
- "Scheme of Stipulated Supply," 53
- Schiller, 780
- Schlesinger, Arthur M., 764
- Schultman, L., Seth, 420
- Scholasticism, 746
- School, Cavalry, 260
  - Coast Artillery, 261
  - Continuation (See Education)
  - Engineers, 262
  - Field Artillery, 261
  - Finance (See Army Schools), 262
  - Infantry Service, 259
  - Organization (See Education)
  - Quartermasters, 265
  - Signal, 262
  - Tank, 260
- Schuyler, William M., 70, 84
- Schwassman and Wachman Comet, 578
- Schwimmer, Rosika, 89
- Science, Books on, 768
  - Literature on, 777
  - Principles and Application, 570
- Scotland, Presbyterian Union, 557
  - Union, Presbyterian Churches, 542
- Scullin, James H., 500
- Sculptural Activities, 808-809
  - Exhibitions, 806-807
  - Galleries, 806-807
  - Individual Awards, 807-808
    - Exhibits, 805-809
- Sculpture, 805-809
- Second International, 499
- Secondary Schools (See Education)
- Securities, Exemptions, 325 326
  - Legislation Accepted by States, 324
    - States, 323, 324
  - Public Protection, 323-326
- Security and Money Markets (See Business)
  - Market Prices, Statistics, 300
- Senate, Coalition in, 5
  - Composition of, 59
  - Debentures, 3
  - Elections in, 21
  - Investigation of Lobbying, 6
  - Leadership, 2
  - League Conventions, 50
  - Membership, 2
  - Members of the, 63-64
- Sergeant, Elizabeth Shepley, 772

- Serviss, Garrett P., 582
- Settlement Act, 134-135
- Sex Education, 506-507
  - Health Measures, 508-509
  - Legal Protective Measures, 509-510
  - Research and Programs, 507-508
- Shakespeare, 778
- Shands, William R., 323
- Shearer Inquiry, 6, 12
- Sheep and Lambs, 371-372, 383-384
- Sheets, E. W., 383
- Sheldon, Preston King, 227
- Sheppard Bill, 20
  - Towner Maternity Act, 530
- Sherman Act, 85, 86
- Shipbuilding, 618
  - Corp., Bethlehem, 619
  - Dollar Line, 618
  - Government Aid, 620
- Shipping Board Activities, 450
    - Construction, 450
    - Conversion Program, 615
    - Future Status, 453
    - Sales of, 615
  - Jones-White Act, 451
  - Ocean-Mail, 451
  - Progress, 449
- Short Story, 773
- Signal School, 262
- Silent Pictures, 825
- "Siloam, The," 147
- Silver, 412-415
  - Production, 413
- Sinclair-Burns Jury Shadowing Case, 88
- Sinking Fund Purchase, 165-166
- Sino-Russian Test Case, 32
- Sisson, Francis H., 164
- Sitterly, Bancroft Walker, 575
- Skin, Bating of, 680
- Skinner, W. W., 677
- Slaughter Statistics, 383
- Slavery Convention, 30
- Slave Trade, 50
- Sleep, 718
- Slichter, Sumner H., 532
- Smith, Alfred E., 15, 21, 96
  - Herbert, 394
- Smoot Bill, 11
- Snowden, Philip, 499
- Snyder, Peter F., 472
- Social Hygiene, 506-510
  - Problems and Conditions, 488
  - Research of the University of Chicago, Society for, 757
  - Science Abstracts, 754-755
    - Cooperative Research in the, 755
    - Encyclopedia of, 754
    - Literature on, 768
    - Research, 757
      - Council, 755-756
  - Work, Integration of, 504
    - Legislation in, 504
    - National Conference of, 502
    - Organized, 502-504
  - Workers, American Association of, 502-503

Socialism, 498-501
  Australia, 500
  Austria, 500-501
  Czecho-Slovakia, 501
  France, 501
  Great Britain, 498-500
  Hoover's Rejection, 9
  Party Membership and Funds, 498
  Poland, 501
Socialist Government, 104
  Party, 527
  Victory at Reading, 498
Sociological Literature, 753-754
  Organization, 753-755
  Society, American, 753-754
    Membership of, 754
Sociology, 753-755
Sodium Chlorate, Use in Weeds, 709
Solar Eclipses, 577
  Lines, Studies of, 576
South Africa, Appropriation for Libraries, 796
  Primitive Man, 758
South Atlantic States, Fisheries, 397
South Carolina, Legislative Organization, 95
South Dakota, Excise Tax, 194
  Silver Output, 414
Southern Negro, Migration of, 469-470
Spain, Fluctuations in Peseta, 347
Spearman, Charles, 761
Speed Governors, 611
Spencer, Edmund, 777
Spheres of American Influence, 148-150
Spinal Anesthesia, 729
Sponge Iron, 597
Spontaneous Ignition, 681
Standard Oil-Elk Hills Case, 88
Standardization, Economy of, 632
  In Buying, 632
Standards, Bureau of, 457
Standard University, Geological Expeditions, 667
Stars, Spectroscopic Studies of, 682
State Administration and Judiciary, 97-99
  Amendments, 91-92
  Constitutions, Initiatives and Referenda, 91-93
  Corporation Income Tax,
    Provisions, Digest of,
      Statistics, 187
  Councils, Composition of, 98
  Department of, 70
  Executives and Departments, 96-97
  Expenditures, 170-172
    Charity, 171
    Educational, 171
    For Specified Items
      Statistics, 172
    Health, 171
    Increase in,
      Statistics, 171
    Natural Resources, 171-172
  Finance, 170-175
State Administration and Judiciary, Geological Surveys, 199-202
  Government, 90
  Health Administration, 734
  Income Taxes, Present Status of, 188
    Proceeds of, 188
      Revenue from,
        Statistics, 188
  Inheritance Taxes, 192-193
    Tax Rates, 186
  Legislation,
    Administration and Investigation, 175
  Legislature and Legislation, 95-96
  Pardoning Power, 97
  Per Capita Receipts of,
    Statistics, 173
  Personal Income Tax,
    Statistics, 187
  Primaries, 95
  Referenda, 92-93
  Supreme Court, 95
  Taxes, 172-173
  Tax Legislation, 173-174
States, Administrative Changes in, 181-182
  National and Interstate Relations of, 90
  Revenue Receipts of, 1927,
    Statistics, 173
Statesmen, Democratic, 15
  National, 13, 14
Statistics, Adjusted Compensation, 271
  Air Service, 637, 638
  Appropriations of Congress, 161
  Area of Public Lands, 212
  Automobile Deaths, 225
    Registration, 225
  Bank Loans, 336, 337
    National Resources and Liabilities, 340, 341, 342
    Resources and Liabilities, 343, 344, 345
  Births and Deaths, 484
  Birth Registration Area, 736
  Causes of Death, 737
  Check Transactions, 304
  Coastwise Commerce, 276
  Cropped Area and Value, 207
  Death Registration Area, 738
  Digest of State Corporation Income Tax Provisions, 187
  Employment, 533
  Federal Reserve Bank,
    Resources and Liabilities, 338
  Fisheries of the United States and Alaska, 398
  Foreign Indebtedness to the United States, 170
  Funded Principals of Foreign Debts, 169
  Gold Stock, 339
  Grain and Cotton Crops in the U. S., 382
  Growth of Electric Light Industry, 234
Statistics, Hawaiian Exports, 131
  Highways, 441
  Homicides, 489
  Income from Export Trade, 643
  Increase in Insurance, 348, 349
    State Expenditures, 171
  Indebtedness of Cities, 178
  Insurance Companies, 350, 351
  Internal Waterway Commerce, 276
  Machinery, Metal, 642
  Manufactures, 421, 463-467
  Manufacturing Industries, 466, 467
  Marriages and Divorces, 485
  Money Rates, 301, 302
  Municipal Art, 116
    Expenditures, 176
    Legislative Bodies, 115
    Revenue Receipts, 177
  National Expenditures, 152-154
    Receipts, 154
  Naturalized Persons, 482
  Net Governmental Cost, Payments of Cities, 176
  Panama Canal, Commerce, 276
  Per Capita Receipts of States, 173
  Policewomen, 113-114
  Population of the United States, 484
  Porto Rican Trade, 132
  Production of Copper, 409
  Prohibition, 17, 18
  Quota Gains in Immigration, 476
    Losses in Immigration, 476
  Races in Hawaii, 130
  Radio Sales, 461
  Railroad Payments, 313
  Railway, 448
  Rate of Gasoline Tax, 174
  Receipts from Public Lands, 209
  Revenue from Federal Income Tax, 186
    Receipts of States, 1927, 173
    State Income Taxes, 188
  Salaries, Foreign Service Officers, 27
  Security Market Prices, 300
  Standing Timber, 394
  State Expenditures for Specified Items, 172
    Personal Income Tax, 187
  States in Birth Registration Area, 736
    Death Registration Area, 735
  Stock Market Shares Traded, 300
  Strength of Regular Army, 244, 245, 246
  United States Bureau of Efficiency, 81
  Vital, 735-738
  Waterways, 275, 276
Steam, 591
  High Pressure, 599-600

Steamship Co., Export, 619
  Oceanic, 619
Steel, 415-417
  And Concrete Framing, 586
  And Iron Industry, 596-597
  Columns, Tests of, 586-587
  Corrosion Tests of, 687
  Exports, 416
  Industry Outlook, 417
  Manufacture of, 422
  Nitrided, 416
  Production Peak, 415
  Yachts, 619
Stellar Parallaxes, 579-580
  Spectroscopy, 580
Stewart, Ethelbert, 519, 534
Stiles, Percy G., 717
Stimson, Henry L., Duties of, 14
Stock Market, Bonds, Volume of Sales, 300
  Call Loan Rate, 302
  Casualty Companies Introduced, 358
  Cause of Advance, 289
  Chronology of Financial Events, 358-367
  Collapse, 297
    Cause, 299
  Conditions, 297
  Crash, President's Attitude, 13
  Drop in Security Prices, 335
  Effect of Break, 298
    Mining Industry, 401
    On Marketing, 391
    Steel, 415
  Future Outlook, 218
  Income on Purchases and Sales, 299
  Influence on Zinc, 417
  Investments Trusts, Operations of, 299
  Money Rates,
    Rise of, 301
  Money Rates, Statistics of, 301, 302
  Relation to Investment Trusts, 329
  Rise in Copper Shares, 298
    Industrial Shares, 298
    Railroad Shares, 297
  Rôle of Banks, 333
  Statistics of Shares Traded, 300
  Transactions, 294
  Volume of Transactions, 297
  Washington Conference, 644
Stocks, Carl W., 442
Stony Gorge Dam, 589
Street and Highway Traffic, 225-227
Strong, Wendell M., 348
Structural Engineering, 583-590
  Shapes, Light-weight, 587
  Steel Buildings, Welding for, 587
    New Alloy, 587
Stuart, Graham H., 36
Submarines, 286
  Protective Devices, 288
  Safety Devices, 615
Sugar, 676, 677-678
  Cane Waste, 677
  Industry of Louisiana, 677
  Investigations, 677-678
Sugar, Overproduction, 314
  World Crisis, 315
Suhrie, Ambrose L., 837
Sumer, Semitic Inscriptions, 789
Summer School for Engineers (See Education)
Sun, The, 576-577
Suprarenal Extracts, 727
Supreme Court, Appropriation for Building, 8
  Of the District of Columbia, 85
  Of the United States, 84
Surgery, 728-730
Surrey, Lord, 777
Survey, Coast and Geodetic, 196
  Federal, 196
  Geological, 196
  Lake, 197
  State Geological, 199-202
Suspension, 612-613
Sweetser, Arthur, 48
Swift, Lucius B., 83
  Wiley H., 525
Swine Parasites, 388
Synagogue, Origin of, 789
'Synchronization at the Load," 601-602

TACNA ARICA, Dispute, 38
  Settlement of, 36, 38
Talking Films, 821-822
Talking Pictures,
  Current, 823-825
Tammany Organization, 103
Tank School, 260
Tannin, 680
  Famine, 680
Tanning Liquors, Tests of, 680
Tanteuxenite, 654
Taracids, 406
Tariff, 4
  Act, 424
  Administration of, 423-426
  Coalition, 4
  Commercial Treaties, 318
  Commission, United States, 426-430
    Data on, 429, 430
  Food Commodities, 428
  Foreign, 316
    Changes in, 317, 318
  Legislation, 429
  Ports of Entry, 423
  Provisions, 426
  Recommendations of President, 11
  Revision, 432
  Truce, Proposal for, 320
Tax Assessments, 184-185
  Commissions, Special, 181
  Legislation, 178-180
  Payments, 184-185
  Reduction, 8
Taxation, 91
  Corporation and Bank, 189-192
  Of Intangibles, 183
Taxes, Land and Property, 181-185
  Miscellaneous, 180
Taylor, Hugh S., 670
Teacher Training (See Education)
Telephony, 608-609
  Standards of Rating, 608
Television (See Radio)
Tempaloy, 594
Terrestrial Magnetism, 658-660
    Instruments, 659
Territories and Spheres of Influence, 127
Testing Materials, American Society, 630
Texas,
  Amendments, 92
  Pipe Lines Construction, 408
  Port Developments, 231
  Presidio Mine, 414
Textile (See Manufacturing)
Theatre, The, 817-821
  Literature on, 768
  Little,
    Educational Movement, 853
Theological Seminary, Jewish, 563
Thomas, Norman, 22, 498
Thucholite, 654
Thury System, 603
Thyroid Gland, 722
Tick Fever, 388
Timber Cutting, 395
  Standing Statistics, 394
Tires, 612
Tobacco Act, 378
  Production, 371
Tobey, James A., 233
Toledo, City Planning, 125
Toll Telephone, 609
Topography of Cities, 664
Total Eclipse, 577
Touch, 749
Trade Associations, Machinery, 644
    Standardization Work, 633
  Barriers, 54
  Commission, Federal, 88
  Competition, 88
  Export, Machinery, 643
    Statistics of, Income, 643
  Foreign (See Foreign Trade)
    Protection, 283
    Restrictions, 50
  International, 30
    Control, 316-320
  Restrictions, 319
  Union Conference, 528
Traffic, Coast, 230
  Lighting, 227
  Parking, 227
  Platoon System, 226
  Regulations, 226
  Saving in, 228
  Signals, 226
  Street and Highway, 225-227
  Texas Ports, 231
  Volume, 225
Transformer Installations, 604
  Oil, 604
  Tests, 604-605
Translations, Greek, 786
Transmission, 611-612
Transport Statistics, 53
Transportation, Water, 230
Travel, 764-769
  Books on, 769
Treasury, Department of, 71-72
  Financing, 165-166

Treasury, Post Office Bill, 160
Treaties, Bilateral, 30
  Completed, 29-31
  Multilateral, 29
  Ratified, 29-31
Treaty Division, Department, of State, 31
  Inter-American Arbitration, 150
    Conciliation, 150
Truesdell, Leon E., 483
Trust Companies (See Finance)
  Activities of, 342
Tube Lighting, 684
Tuberculosis, 721
Tumor Cells, 721
Tunnels, 589-590
Turbines, 596
Turbo-Generators, New Installations of, 600
  Units, 599-601
Turkey, Advancement in Education, 43
  Archeological Discoveries in, 801
  Church and State, 551
  Tariff Bill, 42
Turner, Scott, 409
Typhoid Fever, Death Rate Reducer, 233

UNEMPLOYMENT, 503-504
  Unimolecular Reactions, 671
United Church of America, 544
  Corporation, 218
United States Attorney's Office, 85
  Bureau of Efficiency, 80-82
    Statistics, 81
  Chamber of Commerce,
    Zoning, 124
  Customs Court, 85
    Patent Appeals, 84
  Europe, 53
  Foreign Service, 24-28
  Geological Surveys, 651
  Industrial Prosperity, 660
  International Situations, 24
  League of Nations, 33
  Marines, 148
  Marshal's Office, 85
  Military Problems of, 238
  Production of Gold, 412
  Relation with Haiti, 39
  Revolt in Mexico, 40
  Service for Dominican Republic, 39
  Socialism, 498
  Tariff Commission, 426-430
  Veterans' Bureau, 268-271
  World Affairs, 31-36
Universes, Groups of, 580-581
  Outside, A, 581
Ur, Neolithic Research, 759
Urogenital System, 696
Ursolic Acid, 678
Utah, Legislative Organization, 95
  Mining Possibilities, 414
  Pensions, 540
Utilities, Control of, 214
  Merger Agencies, 219
    Dangers of, 220
    Factors in, 219
    Public, 217-220
    Specific, 218

VACUUM Tube Circuits, 602
  Vancouver, Trade Routes, 229
Vare, William S., 2
Varney, Burton M., 655
Vasquez, President, 39
Vegetables, 391, 393
  Weevil, The, 390
Velvet Bean Caterpillar, The, 389
Venice, Library Congress, 796
Vermont, Tax Commissioner, 182
Vertebrate Paleoneology, 702-705
  Zoology, 695-699
Veterans Act, 8, 269
  Bureau, United States, 268-271
  Medical Treatment, 269
Vice-President, 70
Vienna, Socialism, 500-501
"Vinces, The," 141
Virgin Islands, 141-145
  Education, 143
  Government, 141, 142
  Health, 143
  Industries, 142
  Population, 141-142
  Revenues, 142-143
  Water Supply, 143
Virginia, County Fiscal Reform, 102
  Governorship, The, 96
  Reorganization of County Government, 99
  University of
    Institute for Research, 855
Vision, 748-749
Vital Statistics, 735-738
Vitamin "A" Deficiency, 722
Vocational Education (See Education)
  Rehabilitation, 540
  Tests, 761
Volcanoes, 647-650
  Activities, 647
Volstead Act, 87, 90
Voltaire, 782
Voters, 93
Voting Machines, 94
  Procedure, 93

WACHMAN and Schwassman Comet, 578
Wages, House of, 519
Walker, James, 22
Walsh, Senator, 2
War Department, 72, 238
  Adjutant General, 252
    Combatant, 242, 243
    Non-Combatant, 243
  Control Vested in, 639
  Corps Area, 243
  Finance, 252, 253
  General Staff,
    Duties of, 242
  Judge Advocate General, 253
  Ordnance, 250
Ward Line, 619
Warfare School, Chemical, 264
Warner, Worcester R., 582
Warwick, C. Laurence, 622
Washington, Bank Taxation, 191
Washington Conference (See Stock Market)
  Inter-American Conference, 36
  National Museum, 703
  Regional Planning, 120-121
Water Distribution, Interstate, 90
  Power, 606-607
    New Projects in, 606
    Plants, Output of, 606
      Total Capacity of, 606
  Supply, 232-233
  Transportation, 272
Watertown Arsenal, 264
Waterways, 227-231
  Harbors, 271-276
  Inland, 271
    Corporation, 272
    Importance, 272
  Statistics, 275, 276
Waterworks Association, American, 232
    Taxation, 91
Watson Planets, Survey of, 577-578
  Senator, 2
Wave Mechanics, Development of New, 688-689
  Experimentation in, 690
Ways and Means Committee, 3, 4, 160
Weather Bureau, 458
Weeds, Control, 709
West, W. Reed, 134
  Indian Negroes, Immigration of, 470-471
West Indies, Earthquakes, 649
Westchester County, Amendment, 101
  Planning Federation, 120
Wharton, Edith, 772
Wheat, 380-381
  Acreage of, 380
  Durum, 380
  Joseph Steury, 196
  Production, 370-371
  Variations of, 709
  Winter, 380
Wheels, 612
Whitlock, Herbert P., 653
Whitney South Sea Expedition, Bird Collecting, 668
Wickersham, George W., Appeal to Governor (See Prohibition), 16
  Prohibition head, 15
    Enforcement, 14, 15
Wide Film Offerings, 822-823
Wilbur, Secretary, 858
Williams, Sir Hubert, 665
Wilk's Comet, 578
Willebrandt, Mabel (See Prohibition), 18
Williams, Margaret de Forest Hicks, 24
  Roger O., 666
Wills, Elbert Vaugh, 854
Wilson, George G., 56
  G. Lloyd, 308
  William B., 2
  Woodrow, 12
Wind Stresses in Buildings, 587
Window Glass, Tariff on, 426, 427

Wire Rope Cables, Failure of, 584-585
Wire Worms, 389
Wisconsin, Administrative Reorganization, 97
  Amendments, 92
  Corporation Taxes, 189
  State Budget, 682
Wissler, Clark, 758
Wittig, G. F., 233
Wolf, Austin M., 609
Woodruff, Clinton Rogers, 77, 103, 104, 106, 109
Wool, 372, 384, 39
World Affairs and United States, 31-36
  Alliance, 547
  Court, 29, 47, 50
    America's Acceptance of, 48
      Relations, 48-54
    Protocol, 35
  Disarmament Conference, 52
  Economic Conference, 54
World Affairs and United States, Engineering Conference, 609
  Power Conference, 609
  War
    Supply System, 240
Workmen's Compensation, 513, 538
    Law, 358
    Legislation, 538
Wyoming, Elections, 21
  Excise Tax, 194
  Pension, 541

X-RAY, Diffraction of, 689
  Spectrum, 690

YALE University, 498
  Expeditions, 703
    To Liberia, 667
  Gifts for Research, 851
  Institute of Human Relations, 854
Yancey, Lewis A., 666
Yellow-Bird (See Aviation)
  Fever, 732-733
    Blood Virus of, 733
    Research in, 732-733
Yeshiva College, 563
Young, Owen D., 15, 48
  Reparation Plan, 15, 47, 48

ZINC, 417, 418
  Electrolyte, 683
  Future of, 402
  Industry, 417
  Ore, Distilling, 418
  Production, 417
Zionist, Balfour Promise, 550
  Conference, 564
  Congress, 43
  Party, 550
Zirklenite, 654
Zoning, 121-124
  Cities Added, 122
  Legislation, 122-123
Zoology, Invertebrate, 699-702
  Vertebrate, 695-699
Zurich, Zionist Congress, 43

3 8198 310 791 833
THE UNIVERSITY OF ILLINOIS AT CHICAGO

THIS BOOK IS FOR USE
ONLY IN THE LIBRARY
IT DOES NOT CIRCULATE